ELECTRICAL REVIEW

[ILLUSTRATED.]

A WEEKLY JOURNAL OF

ELECTRIC LIGHT, TELEPHONE TELEGRAPH AND SCIENTIFIC PROGRESS.

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Weinhold's Portable Mirror Galvanometer.

The accompanying illustrations, for which we are indebted to the *Elektrotechnische Zeitschrift*, show a new form of portable galvanometer, specially designed for use in the fitting up of electric light installations, where the ordinary mirror galvanometer with its separate scale and lamp would be too cumbersome. Fig. 2 is a perspective view of the instrument, Fig 4 shows the scale, and Figs. 1 and 3 are vertical sections. The galvanometer coils *B B* are mounted upon a pillar *S* screwed into the plate *P*, which has a conical pivot let into the base plate. On the under side of the same pivot is attached an angle which carries the two adjusting magnets *M M*. The throw of the semi-circular magnetic needle with its thin circular mirror is limited on the left of Fig. 3 by a brass disk and on the right by a lens of 5½ in. focal length. The mirror fits the cavity closely, so as to make the instrument fairly dead beat. The needle is suspended by means of a short rod and cocoon fiber in the usual way, but to fix the needle and mirror when the instrument is not in use a spring passing through an eye in the rod draws the needle upwards. This spring can be lowered and the needle set free by slackening the nut *A*, and thus allowing a spiral spring to depress the pin *D* (Fig 1). The scale, which is engraved on the glass plate *G*, can be observed by means of the telescope *O*, the light from a window or lamp being thrown horizontally upon the small glass prism by means of the mirror *J*. The beam is then deflected vertically and again horizontally upon the mirror by means of the large prism mounted on the stand *T*. The beam from the mirror passes back the same way and produces an image of the scale on the glass plate *G* in the space bounded by the dotted lines in Fig 4. Thus the observer sees the engraved scale and its image side by side, and if the two correspond in position and direction the needle is in its zero position. Before use the instrument is leveled by means of the spirit level *L*, and terrestrial magnetism is compensated by means of the adjusting magnets *M M*. By having two magnets the necessity of settling the instrument exactly into the magnetic meridian is obviated. Each coil contains 1000 convolutions and has a resistance of 90 ohms, and if the two coils are in series a current of .0000013 ampere with the least delicate adjustment, and .00000013 ampere with the most delicate adjustment, produces a deflection of one division.

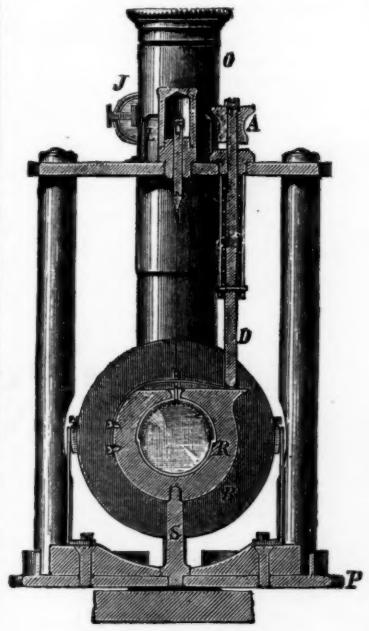


FIG. 1.

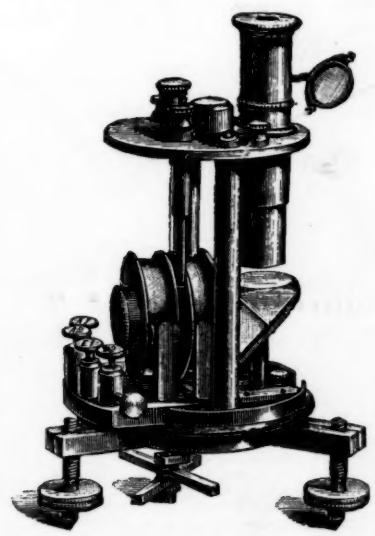


FIG. 2.

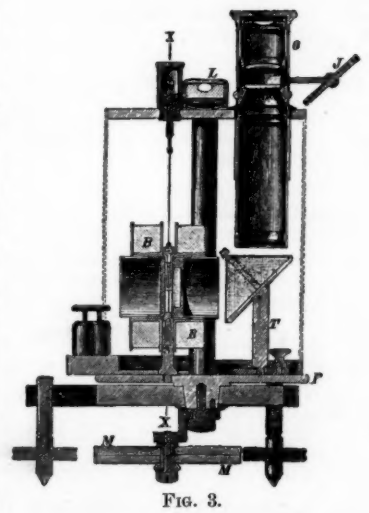


FIG. 3.

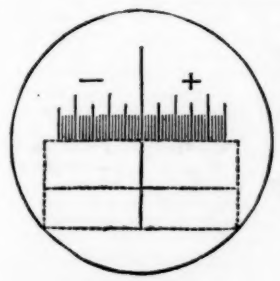


FIG. 4.

WEINHOLD'S PORTABLE MIRROR GALVANOMETER.

Arc Lights for Ambulances.

A short while ago the Prussian War Department announced a competition for a portable military barrack, open only to German architects and civil engineers. And now a novel application of the electric light to military hygiene of the battlefield is said to have been made in Wurtemburg. According to Mr. Nachtigal, a German army surgeon, a light ambulance wagon, easily drawn by two horses, has been constructed, which is equipped with an electric light of 2,000 candle power, generated by means of a dozen galvanic batteries, which last for continuous illumination during a whole night. The arc lamp is suspended from an adjustable truck not unlike some of our patented portable fire-escape apparatus, and the light hangs so that it may be turned free in all directions, which is necessary inasmuch as a parabolic reflecting mirror is placed behind the light in order to increase its power of illumination. Experiments made during the late manœuvers with such an ambulance wagon demonstrated the possibility of successfully lighting a battlefield, to a distance of nearly half a mile from the ambulance, to such an extent as to enable the search for and discovery of the bodies of dead or wounded soldiers, partly hidden from view by shrubbery. It is said that the ambulance wagon is so strongly built that it may readily be driven across fields and meadows without interfering with the proper working of the electric arc light.

The Seel Glow Lamp.

This new lamp, which is the invention of Mr. Carl Seel, of Charlottenburg, is fast winning favor, says our London namesake, throughout the German Empire; in Berlin there are several theaters and restaurants lighted by the new lamp, which is of low resistance, and made upon an entirely new principle. The filaments, which are of two kinds, are prepared from leather and silk threads, coated with a mineral substance and paraffined. The lamp has recently been the subject of litigation in Germany, but the patent has been held valid in the German Patent Office. The Great Seal has been granted to Mr. Seel, both in Germany and the United States of America—strong evidence that the lamp is free from infringement. The patents are owned by the Actien Gesellschaft für Electrische Gluhlampen, of Berlin, which already employs about sixty hands. The company is extending the works in order to meet the demand for its lamps, which, it is said, already exceeds 3,000 per week.

A Child's Theology.

"Mamma, where does Dod live?"

"Way up in the sky, my child."

"Well then, I seen him yesterday a tummin' down de telegraph pole wif a wire in his hand."

SPACE ANNIHILATED.

RAILWAY TRAIN TELEGRAPHY ESTABLISHED.—MESSAGES TRANSFERRED BY INDUCTION THROUGH 20 FEET OF AIR.

Thursday, October 6, 1887, will henceforth stand a red-letter day in the long calendar of successes already achieved by electrical science. It was most completely demonstrated that practicable intercommunication could be maintained at all times between one train and another, whether one or both were at the highest speed or at rest, and either could communicate at will with any station along the railway. A train flying along a hundred miles away from the office of the train dispatcher is as fully under his control as if it were standing on the platform by his side. This has for years been the unrealized dream of harassed superintendents, but is to-day a glad reality. The practical importance of the invention is magnificent in its proportions, and it must necessarily come into universal use.

Pursuant to the invitation extended to the Electric Club by Mr. Cheever, the genial president of the Consolidated Railway Telegraph Company, at the last meeting of the club, a special train left the Jersey City station at 1.30 P.M., October 6th, having on board about 230 members, and other guests of the company, to show them the practical working of the system on the Lehigh Valley Railroad.

The system is the result of a combination and perfecting of the inventions of Edison, Gilliland, Phelps and Smith and was fully explained in Mr. Cheever's paper read before the Electric Club, and published in the REVIEW of 24th ult.

The run to Perth Junction was made quickly, and here the train passed to the Lehigh Valley Railroad proper, which is equipped with the new system. From the junction to Easton the train flew along sometimes at the rate of sixty miles an hour, but its speed was no obstacle to the induction, for the messages, so to speak, kept skipping on and off the train as lightly and easily as a practiced train-hand on a train going but five miles an hour.

Stock quotations were read on the train ten minutes after the closing of the stock-board in New York. The granting of the stay to Sharp was quickly made known in the shape of a message received while the speed was at its highest. No difficulty whatever occurred, and Mr. Henry A. Lewis, chief operator, was comfortably receiving and sending at a speed akin to that of the train, under the watchful eye of Mr. S. K. Dingle, ass't sup't of the C. R. T. Co., while V. H. Emerson, assistant chief operator, had his hands full repeating at Flemington Junction.

During the run to Easton the refreshments gave out and an order for more was telegraphed to Easton from the moving train. Upon the arrival of the train at Easton they were found ready to be delivered to the hungry and thirsty travelers.

Among the messages received was one from Dr. Eugene Crowell to Mr. Edison, who was aboard, congratulating him on the suc-

cess of the invention; also the following, which were received with applause :

"H. C. DAVIS, President Electric Club, care S. K. Dingle. Train No 6, L. V. R R., *via* Flemington Junction:

"Hearty congratulations and success to Induction Telegraphy. May the club's excursion be pleasant and instructive. Keep a watchful eye on your electrical family, and don't let them absorb too much induction, static or otherwise.

ELECTRICAL REVIEW."

"CHAS. A. CHEEVER, President Consolidated R. T. Co., on Train No. 6 L. V. R, R.:

"Congratulations to you and your coworkers on the successful practical development of the Railway Induction Telegraph. You have made an important advance in electrical science, and its great benefits are not yet fully realized. To inventors Edison, Gilliland, Phelps and Smith let fresh honors be given. ELECTRICAL REVIEW."

Col. Gouraud sent the following message to London from the train :

JOHN PENDER, Direct Cable Co., London, Eng.:

"As a representative of so great a portion of the world's telegraph system, you will be interested to receive as it is my privilege and pleasure to send you this greeting under the following extraordinary and interesting circumstances. I am telegraphing these words while comfortably sitting in a palace car of the Lehigh Valley Railroad Company, flying through the beautiful valley of that name at a rate of something more than 60 miles an hour, by that marvelous system invented by Edison and Phelps, known as the induction telegraph, there being of course no wire connecting the train with continuous telegraph wires over which the message is now passing, the current jumping from the car to the wires a distance of 25 feet. We are telegraphing in the same manner to any or all trains on the railway, each train being equally in connection with the train dispatcher. This is the first message sent in this manner for transmission from America to England. A large party of representative telegraphists and scientists are the interested and applauding guests of the Consolidated Railway Telegraph Company, amongst which are many of your American friends, including Mr. Edison and President Cheever, who send their kindest regards.

GOURAUD.

A message was sent to the *Daily World* as the train was nearing Easton, and in a short time an answer was received, and was greeted with cheers by the passengers. About four hundred messages were sent, many of them to prominent people in this country and Europe, among whom were Secretary Whitney, at his house in Lenox, Mass.; John Pender, at London, England; Benjamin Butterworth, Washington; Mme Julie De Ryther, Amos J. Cummings, R. M. Gallaway, and G. Westinghouse, jr.

As the train neared home, the guests cheered the inventors, then Mr. Cheever, the president of the company, and finally its indefatigable secretary and treasurer, Mr. Henry D. Hall.

The following resolutions were passed :

Resolved, That the guests of the Consolidated Railway Telegraph Company, upon the excursion to Easton, given on October 6, hereby extend to the officers of that company their hearty thanks for so pleasant a trip, and for the interesting exhibition given of the practical working of the induction telegraph; and be it further

Resolved, That the world in general is deeply indebted to this company for bringing out and perfecting so valuable an invention.

Altogether the demonstration was complete to the practical success of the system, not only for the use of railways, but for commercial and private purposes.

We briefly tabulate some of the advantages of the system in the operation of railroads.

1. The train dispatcher has full knowledge of the condition and position of each train on his division, and is kept advised of all delays existing or anticipated.

2. He is in direct communication with the men who are to act upon his orders, and can therefore give explanations, if necessary, and is not obliged to trust to a third party for their safe delivery.

3. It saves all the loss of time necessary to secure the presence of the conductor and engineer in the telegraph office. Orders can be issued at any time. In a single message, if necessary, every train going in either direction on his division can be brought to a stop.

4. The necessity of depending upon a telegraph operator or messenger to flag and stop a train and deliver orders is avoided, and the danger of collisions due to a failure on the part of the train to receive such orders is entirely done away with.

Duplicate messages or orders for all trains interested can be sent as one, and must therefore be identical.

5. In issuing orders, changing, "meeting," and "passing" points, loss of time can be saved, and in many cases orders given and acted upon which would have been impossible without immediate communication with the train.

6. Or, in general, time or signal orders, orders to extras annulling schedules, to run "regardless," etc., etc., can be given more quickly and acted upon with a greater degree of certainty when given direct to the trains than when compelled to await their arrival at a telegraph station.

With the introduction of this system many telegraphic stations could be abandoned, particularly on long roads running through a country not fully settled. This would not destroy telegraphic communication with the locality, as such train in itself becomes a moving telegraphic station, and all points at which trains stopped would essentially become telegraph stations; the railroad employe at the point attending to receiving and collecting for messages to be forwarded, without the necessity of the writer being on the train or consuming time of the train operator. On roads doing a comparatively large passenger business, travelers would send many messages from the train that would never be sent if the writer were obliged to wait the arrival at some station, and there perhaps hunt the telegraph office in the dark through rain or snow storm.

A few of the circumstances under which the traveling public would use the train telegraph, occasioned solely by the fact that they are on board a train and apparently away from communication with the outside world, may be mentioned as follows :—

1. The passenger is literally sitting in a telegraph office while aboard the train.

2. Passengers may be reached by friends by telegraph

3. Telegraphic communication to any point reached by the Western Union or other telegraph lines.

4. Instructions may be sent to business houses.

5. A friend may be notified of arrival.

6. A carriage may be ordered to meet a train.

7. In case of important business appointment when train is delayed at a distance from any regular telegraph station, a passenger may notify parties of inability to keep appointment.

8. When required, police or detective assistance may be had on arrival of next train.

9. Escaping criminals may be apprehended through information and description sent by telegraph.

10. In cases where it may become necessary to recall a passenger who has just started, he may be reached before completing his entire journey.

11. Rooms at hotels can be secured in advance of arrival.

12. Friends may inquire if certain parties are on board certain trains.

13. Friend may be called to telephone at any city station on line, and directly communicated with.

14. In case of accident or sickness, physician may be notified to meet train or carriage, or ambulance may be called.

15. Stock and grain quotations may be obtained.

16. Prompt news of any unusual event.

17. General, political and financial news.

18. Reports of results of sporting events.

19. Telegraphic communication of a private nature.

20 A friend may be notified at house of a detention.

21. Sleeping berths or staterooms may be ordered.

22. Theater tickets may be reserved.

23. Forgotten or belated baggage or parcels may be telegraphed for.

24 Answers to all messages sent may be received.

25. In case of accident on any part of the road, conductor can instantly communicate the fact to train dispatcher.

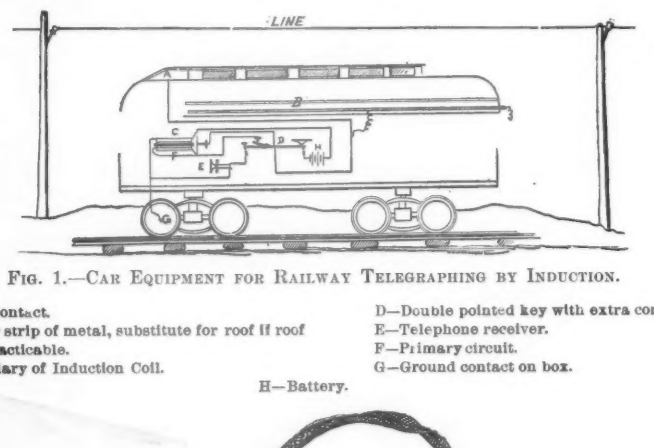


FIG. 1.—CAR EQUIPMENT FOR RAILWAY TELEGRAPHING BY INDUCTION.

A—Roof Contact.
B—Rod or strip of metal, substitute for roof if roof not practicable.
C—Secondary of Induction Coil.
D—Double pointed key with extra contact
E—Telephone receiver.
F—Primary circuit.
G—Ground contact on box.
H—Battery.

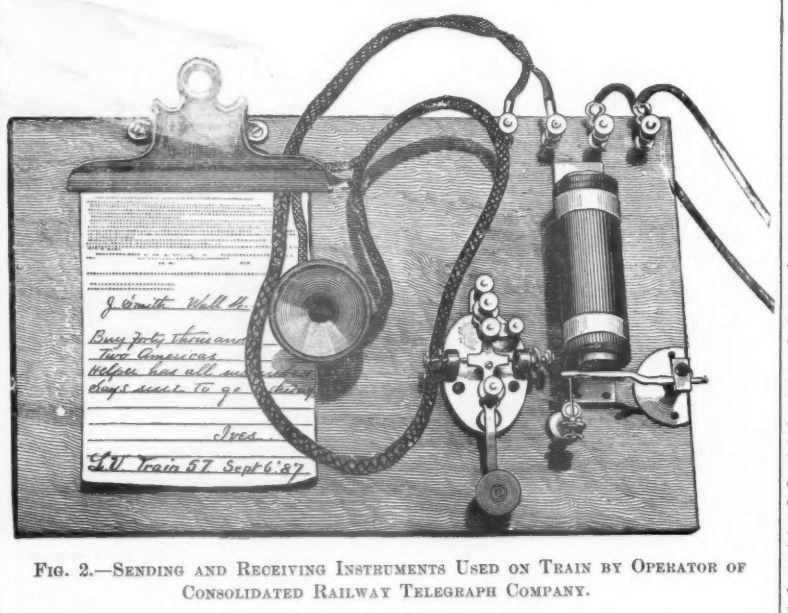


FIG. 2.—SENDING AND RECEIVING INSTRUMENTS USED ON TRAIN BY OPERATOR OF CONSOLIDATED RAILWAY TELEGRAPH COMPANY.

Partial list of the guests of the Consolidated Railway Telegraph Company present at the exhibition of their system in Train Telegraphy, upon a special train, October 6th.

Thos. A. Edison.
Ezra T. Gilliland.
Chas. A. Cheever.
Wm. Stanley Goodwin, Genl Supt. Lehigh Valley R. R.
John D. Garnett, Vice-President Lehigh Valley R R
Messrs. R. H., W. A., and E. P. Wilbur, Jr., of the L. V. R. R.
Chas. Selden, Supt. Tel. Baltimore & Ohio R. R.
Chas. Hartshorne, Vice-President L V. R. R.
Col. L. Hincken, of the Produce Exchange
Geo. A. Hamilton, Chief Electrician Western Union Tel. Co.
Rufus Hatch.
Dr. A. G. Hummel, of Philadelphia.
Job H. Jackson, of Jackson & Sharp Co., Wilmington, Del.
Frank Cazenove Jones.
John C. Tomlinson.
David Williams.
Wm. R Warner, of Philadelphia.
Henry C. Davis, President of the New York Electric Club.
Prof. P. H. Van Der Weyde.
Cornelius Van Brunt.
Jose Garcia de la Torre, of the Spanish Legation.
Wm. C. Tyler, of Chicago.
Lieut. F. W. Toppan.
A. O. Tate.
E Van Norden.
Geo. Norman Wiard.
Franklin H. Woodruff.
R. S Walker.
Henry L. Walter.
Geo. G. Ward, Genl. Manager Commercial Cable Co.
C. L Wells, D. D.
J. J. Wolhtman.
C. H. Barney.
B. B. Adams.
E. B. Byington Genl. Pass. Agent L. V. R R.
Garret Brodhead, Train Dispatcher L. V. R. R.
A. R. Beeken.
A. P. Blakesly, Supt. M. & H. Division L. V. R. R.
A S. Brown, Genl. Supt. Mutual Union Tel. Co.
D. C. Brown, of the Lowe Manf'g. Co., Philadelphia, Pa.
Geo R. Bull, of Connecticut.
E. Martin Black.
Prof. Geo. F. Barker, Dean of the University of Pennsylvania.
W. L. Boyd.
Dr. J. H. Billings.
J. C. Blydenburg.
J. A. Barrett, of the Long Distance Telephone Co.
Eugene G. Blackford, U. S. Fish Commissioner.
A. S. Beves.
R. R. Bishop.
C O. Baker, Jr.
Henry Beer.
Louis Baur.
Capt. Willard L. Candee.
Chas E. Crowell.
Wm. T. Call
Aug. T. Chur.
G. B. Coggeshall.
Chas. T. Cunningham
Lieut.-Commander W. S. Cowles, U. S. N.
Jas. Donnely, Supt. New Jersey Division L. V. R. R.
E M. Davis.
E. C. Davidson.
P. M. Diver, Division Operator L. V. R. R.
Geo. D'Infreville, Electrician W. U. Tel. Co.
H. P. Day, of Connecticut.
R. N. Dyer.
A. De Castro.
Chas. Dutton.
E. G. De Bernales.
Henry Dalley, Jr.
H. J. Egleston.
J. H. Emerich, Supt. Postal Tel. Co
Lieut. H. Erben, U. S. N
Prof. A. K. Eaton, of Brooklyn, N. Y.
J S. Forsyth, Boston, Mass.
J. R Fanshaw, Secretary L. V. R. R., Philadelphia, Pa.
M. N. Forney.
L. L. Foley, Tel. Supt. Del., Lacka. and Western R. R.
Thos. Fowler.
Frank Goodwin.
Frank S. Gannon, Supt. Staten Island R. R
Col. Calvin Goddard.
Col. Gouraud, of London.
M. W. Goodyear.
Felix Gotschalk.
Phillip Germond, of Peekskill, N. Y.
Wm L Keese,
T. H. Knox, of the *Official Railway Guide*.
Prof. Louis H. Landy, of Columbia College, New York.
M. B. Leonard, Supt. Tel. Newport News and Mississippi Valley Railroad, Richmond, Va.
Geo C. Lee.
H D. Lyman.
Chas. H. Luscomb.
T. J. M'Tighe.
Jos. Nehrbach.
W. E. H. Marsh
Dr. Wm. J. Morton.
Prof. Henry Morton, President of Stevens Institute, Hoboken, N. J.
Frank Maguire.
Thos. M. Moore, of Passaic, N. J.
Morris White.
J. Marthon.
Horace J. Morse.
Frank McArthur.
Henry C. Townsend.
Henry D. Hall.
Lucius J. Phelps.
S. K. Dingle.
Willet Seaman.
Chas. McLaughlin.
E. Mignault.
O. E. Madden.
J. F. Noonan.
Wm Orton.
Dr. Geo. Newby.
Chas. W. Price, Sec. Electric Club.
Geo. M Phelps, Jr.
C. S. Ryman.
H. A. Reed.
H. W. Pope.
Col. W. E. Rider.
John B. Powell.
J. R. W. Shriver.
Gerritt Smith, Western Union Tel. Co.
Rev. S. E. Snively.

W. D. Sargent.
E. J. Hall, Jr., General Manager American Telephone and Telegraph Co.
John W. Scott.
Wm. M. Safford.
J. M. Schermerhorn, Jr.
Col. A. J. Shick.
H. L. Storke.
Prof. Carl Seiler.
E. T. See.
Wm. W. Share.
J. B. Stewart.
Wm. H. Smith.
J. A. Seely, of the Metropolitan Telephone Co.
Vernon Seaman, of San Francisco, Cal.
Vice-President Wm. B. Somerville, of the Western Union Tel. Co.
H. Morris Smith.
W. A. Ferry.

The Dinner at the Electric Club.

At the invitation of the Electric Club, through President Davis, a large party of the excursionists sat down to an admirably prepared dinner at the Hotel Dam. The day's outings had induced a great appetite in every one, and they did justice to the efforts of the cook. Among the forty or more present were Messrs. Davis, president; Edison, vice-president; Col. John B. Powell, vice-president; Chas. A. Cheever, Col. Gouraud (of London), E. T. Gilliland, J. C. Tomlinson, H. D. Lyman, W. L. Candee. J. O'Shaughnessy (of Cincinnati *Commercial Gazette*), Lieut. Toppan, A. O. Tate, Col. Geo. C. Lee, J. A. Jackson, of Wilmington, Del.; W. D. Sargent, E. H. Hall, jr., Chas. Dutton, C. O. Baker, jr., Messrs. Clark and Campbell, of Boston; H. J. W. Dam. G. B. De Revere, H. R. Garden, M. W. Goodyear, Geo. Worthington, Chas. Selden, T. J. McTighe and H. A. Townsend.

After the induction of a sufficient amount of edibles to stay the craving appetites, some toasts were responded to by President Davis, C. A. Cheever, Col. Gouraud, Messrs. Tomlinson, O'Shaughnessy, Jackson, Toppan and Dutton. Col. Gouraud interested those present by a comparison of the development of electrical science in its commercial applications, between this country and England. He had started the first telephone exchange, outside this country, in England, and to-day, while the United States had 127,000 phones in use, England had but 13,500; and so it is with the electric light and electric motors To-day's performance, he said, was a revelation to him, accustomed even as he was to the surprises of electrical science. He congratulated and wished success to the Railway Telegraph Company, and thanked the Electric Club for their hospitality. After an unusually pleasant evening, the guests dispersed, and doubtless many pondered over the future in store for this new child of electricity born into the world of usefulness.

The Electric Light Installation at the Chateau de Ferrieres.

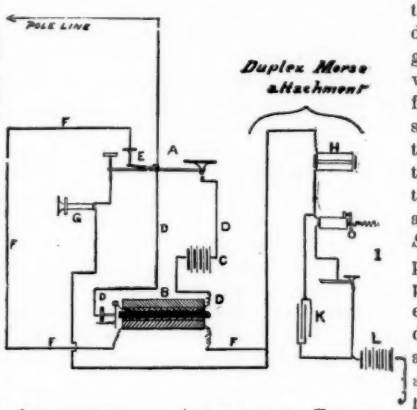
Although the scientific world has by this time become accustomed to seeing M. Marcel Deprez fail in his endeavors to transmit energy electrically over long distances, it will yet be a surprise to many to hear that he has also failed in the simple case of an electric light installation. Such, at least, is the information conveyed by the last issue of the *Bulletin International de l'Electricite*. It appears that M. Marcel Deprez's staunch patron, Baron Alphonse Rothschild, intrusted him with the work of lighting his private residence, the Chateau de Ferrieres, electrically, and when the installation was completed a numerous company was invited to witness the first run. According to our contemporary, the machines, which were made under the personal supervision of the French savant, refused to work, and this mishap gave rise to lively criticism on the part of the visitors. Our contemporary concludes its article with the following remarks: "Of all the failures which have hitherto taken place, it appears that this last is most keenly felt by Baron Alphonse, and it is rumored that he has the intention of definitely withdrawing the financial support he has hitherto accorded to M. Marcel Deprez.—*London Industries.*

* * The ancient Viking ship discovered several years ago at Gokstad, in Southern Norway, will be described in *Scribner's Magazine* for November, by John S. White, LL.D

Telephonic Enterprise in England.

The success which has attended the introduction of the telephone in this country can hardly be said to have been of a marked character. Telephone exchanges have been established in the greater number of the important towns of the kingdom, and many private wires have been provided. Communication by telephone between several of the largest commercial centers and surrounding towns, as also between some of the larger cities—as Liverpool and Manchester—have been brought into use. But although thus much has been done, the progress here is not to be compared with that in the States. Many causes have contributed towards this result. The management of the parent company might possibly have been more liberal. At the same time it cannot but be regretted that the chief source for fostering rapid communication throughout the country should have looked upon it so coldly. It cannot be said that telephone enterprise has been fostered by the Post Office telegraph authorities. No right hand of fellowship has been theirs—rather the reverse. And yet what is the telephone but a telegraph? And if a telegraph, why should it not be fostered and dealt with by the Telegraph Department of the State in such a spirit as would enable it to become at once that useful adjunct to the telegraph which it is bound ere long to be? The State Telegraph Department was established in order to afford increased facilities in telegraphy. At that time the telephone was—as a practical instrument for commercial purposes—unknown. The monopoly which was given to the State was given for the same reason as that for which a State Telegraph Department was created. The Post Office Department is a department which has earned over and over again the thanks of the nation for the facilities it has from time to time afforded the commerce of the country—for the manner in which it has by these facilities fostered that commerce—and we wish to be the last to doubt the good intentions of the telegraph branch of the service in the conduct of its relations with the telephone companies. We accord the department all due credit for pursuing that course which it doubtless believes to be for the interest of the department; and if the interests of the department were the only interests to be considered, we should be all at one with the department in that it has well and faithfully discharged the trust reposed in it. But is this so? Are there not other interests—the interests of the community at large—to be considered? It was with the object of more thoroughly providing for the public requirements that the State was intrusted with the establishment of a telegraph department and granted a monopoly. No one will, in these days, dispute that the telephone is, in its application to the internal commerce of the country, as useful and as indispensable as is the telegraph. Will any one assert that its facilities for carrying out its duties are in any way commensurate with those possessed by the State? It is patent such is not the case, not only so, but that the telephone companies are obliged to work under almost exceptional difficulties. On all their exchange work they pay toll to the Government. They are driven from all the main road routes, practically so, for the reason that these routes are already occupied by the Post Office, whilst they are entirely shut out from the railway system

Could we regard the question as one of a purely commercial character between one company and another, we should have nothing to say; but looking upon it as it stands, as between a State Department and a company, we feel bound to take a higher standpoint—that which affects the general community. We have not to deal with two large commercial companies, but with a State Department constituted for a certain purpose, and we cannot help thinking that had circumstances admitted of the Post Office according to the telephone companies all those facilities which lay in its power, the enterprise would have shown a different result from that which has so far been achieved. We are tempted even now to indulge in a hope that, having regard to the utility of the invention, the Government may see its way to ease telephony of its burdens and to help it on its way. This is to be effected not merely by reducing the tax placed upon exchange transactions, but by affording some of those facilities acquired by the department on railways and at other points. No doubt the trunk lines of railways are valuable to the department, and a time will come when they will be filled, but there are many railway lines which will never be required for Government wires, and which would probably be a boon to the telephone companies. We are aware that the right to use these lines has been acquired by the Post Office at some cost, and it would not be reasonable to suppose that the department would part with this right without some payment. This we presume telephone companies would readily recognize. We heartily commend the suggestion to both parties. Although telephone enterprise has not made that progress it ought, it has yet succeeded in establishing itself as a useful public institution, the utility of which is being daily more and more felt.—*London Electrical Review.*



Arrangement of Apparatus at Terminal Station.

A—Double Pointed Key.
B—Induction Coil.
C—Battery.
D—Primary Circuit.
E—Extra Contact Key.
F—Secondary Ck't.
G—Telephone Ck't.
H—Electro Magnets.
I—Morse Apparatus.
J—Earth Connection.
K—Condenser.

Fig. 4.—Operator's Outfit, Battery, Instruments, Etc.

Unsteadiness in Arc Lamps.

I recollect an attempt once made by me to work an arc lamp upon a gramme machine driven by an irregularly working motor. The arc length was controlled by a pair of thick wire solenoids; of course the oscillations of the cores of the latter corresponded with the speed variations, and the result was simply frightful, every piston stroke being visible in the arc. The lamp was at once discarded and replaced by a regulator constructed with a magnet drawing down the lower carbon to a fixed distance. This changed at once the state of things. for, although the swing of the ampere needle indicated a considerable variation of the current intensity the arc remained admirably steady. Evidently this is an extreme case, since in the generality of instances the engine works well, but the same effects are always manifested whenever a variation of the current strength occurs, and obviously the impurities and gases contained in the carbons and the shifting of the arc upon the points are the principal causes of sudden changes of the arc resistance. The steadiness of *la Lampe Soliel*, which was to a certain extent independent of fluctuations of the current, is probably to be attributed to the fixity of the electrodes, at least as much as to the incandescence of the marble block. It must be allowed that the separate arc striking magnet, although so advantageous in many respects, has, unfortunately, a great defect, since it augments the chances of a "break down" if the lamps are driven by a series dynamo; thus, supposing a momentary interruption of the current to occur, and that the magnet in letting go its armature does not re-establish the contact between the points, the machine will be unable to send a current through the high resistance shunt coils, and a 'break down" results.

To avoid similar accidents I have generally employed a thick wire "cut-out," which throws a resistance into the circuit in place of the extinguished arc.

Another method used in the Sellon arc lamps, and applied, if I remember rightly, for the first time in the "Pilsen." consists in winding a helix of thick wire upon the shunt coil. The said helix being thrown into circuit by the cut-out, draws down the armature, thus releasing the carrier and allowing the carbons to come into contact.

In the Breguet lamp a rod attached to the armature of the arc striking magnet engaging with that of the shunt coils when the former is released, lifts the pawl controlling the star-wheel, and allows the carrier to fall.

A most ingenious form of magnet is that invented by M. Abdank-Abakanowicz. The core of this magnet. which is attached to the carbon carrier, is hollow, and contains a movable rod bearing the upper carbon. The armature acts like a ring clutch when attracted, and gripping the above-mentioned rod lifts it with the carbon, and forms the arc. Should the current cease to pass the armature is released, and allows the carbon to fall until contact is established between the points, whereupon it is once more lifted and the arc again struck.

Of all these methods this latter is probably the best, but of course this is a matter of opinion. If the partisans of the arc striking magnets are few, still fewer must be the admirers of perhaps the best known of its forms.

My personal experience in these matters has disposed me to consider that, supposing a double movement to be inadmissible, the next best thing is certainly a lamp constructed with a separate arc striking magnet. But if this arrangement be employed the feed ought to be decidedly slow, and the lamp easily adjustable and well adjusted, since in case of over-feeding even a partial automatic readjustment of the arc length is impossible.—F. de Wolffers, in London *Electrical Review.*

—— M. E. Julien has been awarded the Cross of the Order of Leopold, in recognition of his services in the application of electricity for traction purposes, as employed on the Brussels tramway lines.

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We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting, on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

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NEW YORK, OCTOBER 15, 1887.

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In these days of disputed inventions, we think there is one invention that stands out as the work of one man—the phonograph, by Thomas A. Edison.

Dr. Leonard Waldo, of Yale College, will address the Electric Club at its regular monthly meeting, October 20th. This will be the last regular meeting before the opening of the new club house on Twenty-second street.

There seems to be no reason to doubt that the Western Union Telegraph Company has purchased its ablest and most vigorous competitor—the Baltimore and Ohio Telegraph Company. This does not, however, leave the field entirely in the possession of the Western Union Company, as the Postal, with a number of strong men backing it, can still be counted on as a competitor.

It is worthy of note that all the discussions at the recent telephone convention in Pittsburgh related to methods of improving the apparatus and service of the companies engaged in the telephone business. The relations of the telephone to the public and to legislation were not discussed, the leading telephone companies evidently appreciating the fact that all annoyances of this nature are best remedied by improving and advancing the service.

The successful house-warming of the Boston Electric Club was gratifying to those interested in electricity, as proving the important position the club will take as a scientific and social factor in the business life of Boston. Less than three months from the time of organization, the club has a membership of 160, and a large number of applications to be acted upon. Full credit is due to the entertainment committee for the success of the first social event of the club.

The Engineering and Building Record is now the title of the paper hitherto known as *The Sanitary Engineer*, the old name being retained as a sub-title. On making this change it says editorially:

"We have decided to change the name of this journal to the title given in this issue. It is not intended to change the character of the paper. Our object is simply to convey by the first part of the name adopted the scope of the matter it regularly gives its readers.

The test given on Thursday last of the induction telegraph system on the Lehigh Valley Railroad was a complete exhibition of the excellent workings of this new means of communication. The passengers sent and received messages while the train was in motion, and regular telegraphic train orders were received from the general dispatcher's office by the conductor and engineer, conclusively proving the applicability of the system to the daily handling of trains. We think that in this respect the induction telegraph has a most valuable and important misson, in addition to the convenience it will be to the passengers.

ELECTRIC MOTORS IN GREAT DEMAND.

Electric motors need more than a passing thought. They are most certainly crowding out small steam plants, and in doing so, and thereby creating popularity for themselves, they are opening up new paths for the genius of adaptation. They are capable of fair powers at fair cost and can be put almost anywhere and driven to suit the circumstances. And when supplied with current from the mains of some lighting station, nothing can be neater, or more desirable as to behavior, and thousands of places exist where their adoption at or even above the cost of steam power will be a benefit. Thousand of shops could to-day utilize them and save money, if the owners could only be brought to a knowledge of the facts; and we cannot too strongly impress the local electric lighting companies with the importance of spreading the truth in their districts, for there is a sure harvest of profit only waiting to be reaped. To-day electric motors, in their mechanical construction, and in matters of wear and tear, and ease of handling, are equal to the modern steam engine, and in the matter of convenience comfort and adaptability they are far, very far ahead.

THE SITUATION AS IT IS.

Electrical progress has been almost in keeping with the inconceivable speed of electricity. But a few years back, within the memory of all our readers, what a paltry corner of usefulness was occupied by electrical invention. A few improvements in batteries, and the then wonderful development of the electric telegraph in its various modifications, comprised about the whole crop visible in the field. At the Centennial in 1876, only eleven years ago, some feeble attempt was made to show that electric light *could be* produced from a dynamo, which was spoken of as a "very interesting exhibit;" Prof. Bell's first crude telephone attracted thousands of curiosity seekers, and the verdict was "a beautiful conception, but a mere scientific toy." Prof. Gray exhibited various forms of what has since become one of the mighty arms of multiplex telegraphy; but most people looked askance at the models as the "in'ards of a church organ," and passed them with indifference.

To-day, only eleven years later, the arc lights of the United States are fast approaching two hundred thousand, while the incandescents have long since passed the million mark. It would be but a one-horse telegraph company that didn't use the duplex and quadruplex systems almost exclusively; the harmonic's dainty song is heard everywhere; electroplating has got to be an indispensable adjunct to a great body of industries; the telephone has become the business man's *fidus achates*; a solid phalanx of electric motors are slowly but surely pushing the small steam plants into the scrap pile, with the moral support of thousands of domestic motors, sons of the same sire; and the knell of the poor street car horse has been tolled. We are surrounded with a myriad of smaller devices, such as alarms, annunciators, gas lighters, mine exploders, impossible to catalogue here. And we have several very sturdy infants growing. Already electric smelting has taken a strong position commercially; electric welding—or more generically electrosmithing—has come to stay, and will soon take its place in the rank and file of labor-saving inventions; storage batteries are gradually giving up their secrets and becoming amenable to scientific law, and they have a vast field of usefulness awaiting them. The review becomes bewildering and the mazes of possibility are inexhaustible. Where will it end? Nowhere, in *our* lives. As the years swell into decades, and the decades round into centuries, it will be found that the true flood gates of improvement were opened by the discoveries and practical applications of electricity in the decade now completed, and the onward and ever widening torrent will end only at the crack of doom.

EARTH CURRENTS AND TERRESTRIAL HEAT.

A correspondent of our esteemed contemporary, *Industries*, of London, says:

"It is a recognized fact that the temperature of the earth increases with depth below surface at the rate of about 1° C. per 60 feet to 90 feet, so that at merely a few miles depth an enormously high temperature probably exists. It is usual to regard this terrestrial heat as the residue of an intense heat which once pervaded the earth's mass, and which has since been and is still being dissipated slowly into space. But since electric currents always produce heat in the conductors they traverse—and the earth is unceasingly traversed by the so-called earth currents—it seems just possible that the internal heat may depend on this cause alone. I would like to ask whether any of your scientific readers consider that the earth currents sufficiently account for the temperature gradient within the earth's crust?"

A correspondent signing himself, "Cagliostro" presents his views in another column on the statements of Inventor Edison concerning a new discovery of his which is to be announced six months hence. We are sure that the "advance in electric art" which Mr. Edison claims to have discovered is not a chimera, but will prove to be a valuable and interesting contribution to electrical work and study—but time will prove. Meanwhile, our safe is large, and not particularly crowded, so we hope to be able to accommodate all who desire to deposit a record of their inventions in it.

OUR CHICAGO LETTER.

(From a special correspondent of the ELECTRICAL REVIEW.)

"Ah!" said a gentleman of foreign birth, "you Americans seem to know so much about things—at least you seem to think you do. Now here, for instance, one of you has put this motor in here, and it doesn't work at all satisfactory. I know something about mechanics. You just watch, now, and see how that blasted ventilator fan rattles and kicks when I throw the current on."

He made a quick throw of the lever, from zero to the other extreme of the arc—and it *did* rattle—and kick—and flounder; as a gentleman standing by said, "just like any street car horses, when the driver tries to make them start a full load with the brake on."

"Yes," replied the electric light man, "we have another just such a case in an outside town. I put on a motor to grind coffee, and no one ever saw a handsomer commutator, when it went in. Glazed to a nicety, and as uniform as a chronometer wheel. I was out there the other day. Old Huzzy-guzzy, who runs it and thinks he's an engineer, lets it stand idle when not grinding, and tinkers at the brushes all the time. In comes a customer. Then Huzzy-guzzy, to the lady:

"Yes ma'am, six pounds. Grind it while you wait. Only take a minute, and as if by military command—'*Grind!*' in three motions! *One!* (dumps six pounds of coffee into the hopper); *Two!* (give her the full current with a jerk, and makes every light in the house say thankee, ma'am); *Three!* (swear at the machine.)

"You ought to see that commutator. Oh, my! Oh, my! Why it's got ruts and rough spots 'till you can't rest, and the old fellow makes it spark like a Catherine wheel."

Before the *seance* was finished the man who knew something about mechanics had learned something about applied electricity; but it takes him longer now to start and stop his great big fan.

The Central Electric Company has just assumed the agency for the Okonite wires, and promises to keep a full line of all sizes and insulations.

The Western Electric Company refutes the story of a local lightning and thunder storm around the Grand Pacific Hotel the evening the President was in town. It all arose from reflected light, and was an optical delusion. Frank Stewart says a new plant of thirty lights of the W. E. system was placed in the hotel, and the landlord (who is a jolly good Republican, by the way,) on the one side of the street, and the rubicund visaged Chief Magistrate on the other, sent the reflected rays in all directions.

Marshal Field & Co., occupying an entire square, have running, in addition to an Edison incandescent plant of something near 500 lights, an arc plant of 180 lamp capacity. The firm has just arranged for an increase of 50 arc lights, making a total of 230, which will be one of the largest installations, if not the largest, of any one system in the United States. The arc lamps and dynamos are all from the Western Electric Company.

The past week in Chicago has been one of fuss and feathers, powder and lightning, marching and music.

There was first the Grand Encampment, which has not proved an unalloyed success. The evenings at the race grounds, on the west side, were made cheerful by a large display of the Ball system of arc lights.

Extra lamps were put in everywhere down town, where they could be stuck on, in honor of his Excellency and the excellent lady accompanying him. The grand receptions at the Columbia Theater in the evening, and at the Palmer House in the P. M., were grand ovations. Fireworks blazed throughout the former display, and the fire worshipers stood with half bent knees ready for a run. They had it; for, as is usual, though not on the programme, there were two still alarms, and the boys had great times getting

through the jam. No harm was done, however.

Spanning from walk to walk on Monroe street, at the crossing of State, a beautiful arch was erected, and this was almost literally covered with United States incandescent lamps, tastefully arranged by Prof. Badt and his men. The effect was indeed fine, and the whole was the subject of universal commendation.

The chief trimmer of the Brush Electric Light Company at Detroit was a victim to the current on the evening of the 3d instant. He was at work on the line while current was flowing, with the result of being "caught," and having his body left dangling on the wires sixty feet from the ground. When, after considerable difficulty, the body was taken down, there were some slight indications of remaining life, but he died almost at once. A young lady to whom he was engaged was in the crowd which gathered, and when, in reply to the question, Who is he? she was told it was Hiram Corliss, she fell in a swoon. She had no suspicion that he was at that time in that portion of the city.

When it is so self-evident that no man can do repairing and handling of electric wires safely when an arc current is flowing, it is positively criminal to permit this species of foolhardiness. No excuse can be offered for not stopping this unnecessary—nay, wanton sacrifice of human life; and if the companies themselves will not inaugurate the necessary reform, it is time that the lawmakers were taking a hand in defense of the rights of electric employes.

There is an Electric Cure Company in Chicago with a capital stock of $10,000. The articles of corporation say that the object of the organization is to sell the "Elliott electric battery in a bottle."

The readers of the REVIEW will never have reached the "steep where fame's proud temple shines afar" until they have seen and felt the effects of this electric battery, and listened to the polished eloquence of the dispenser of this great boon.

First there's a bottle—a one-ounce bottle. In it there are sundry and several "ingregiences," which give it an aromatic character. Then there is some cotton wool, that holds in the possible spill. There is a small amount of sulphuric acid and water, a piece of sheet zinc, and a piece of sheet copper, not connected either in or out of the anti-spill cotton stuffing. All you have to do is to smell, and—you are satisfied. The vendor says it is the only battery of its kind in the world. It is safe to believe him. He says it will be as good and as powerful in two years as now. He probably tells the truth. It is a great invention, and sells for fifty cents—sample snuffs free.

The bookkeeper of the Central Union Company, who got away with $15,000 before he was caught, was sentenced last week to the penitentiary for four years. Gambling of the wildest kind was his passion.

"My Chinese correspondent tells me" that in San Francisco "Johnny China habee allee samee one big Joss dlagon," and Melican man fixed it up for the procession, so that by properly manipulating the internal arrangements the chap who walked beneath it on the long tramp could open its mouth, make the darting tongue flash and sparkle, and cause the body to go through the most fearful contortions, and blow sparks from its nostrils. The Chinamen consider the American Improved Joss a great advance over the original bamboo and paper devil. It is almost needless to say that electricity was at the bottom of it all.

The city fathers are again after the Chicago Telephone Company. Some time ago an ordinance was drawn up which was submitted to the law department and pronounced faulty. This proposed a direct tax of $10 for each instrument leased by the company.

The matter is again before the municipal authorities. The judiciary committee of the council held a meeting last week, and considered the proposition of Alderman Hamline to exact from them a fee of $10 for each instrument, before granting any further permits to open streets, and the committee finally agreed to report favorably on the ordinance. Opinions differ as to the legality of the proposition, but time will tell the tale.

The Central Union Telephone Company has settled the suit of Attorney-General Michener, for unpaid taxes, at Indianapolis. The company paid the amount of $1,641.25.

At the regular fortnightly meeting of the Chicago Electrical Club, Mr. E. P. Warner was on the list for a paper on the automatic regulation of dynamo currents. Business called Mr. W. out of town, and at almost the last moment Mr. J. L. Barclay, of the Sprague Motor Company, prepared and read a paper on "Why Electric Light Companies should Distribute and Sell Power." The paper was replete with statistical arguments and facts, and Mr. Barclay was listened to with marked attention. At the close he was made the recipient of a most earnest vote of thanks, unanimously tendered, for his happily conceived "supply" paper.

The matter of permanent quarters was discussed. The treasurer reported $550, so far, collected on account of a furnishing fund for the rooms. The secretary announced twenty-three applications for membership, since the last meeting.

The venerable president read an invitation from the sister electric club in Boston, to attend a housewarming on the 5th. That officer was instructed to telegraph thanks and regrets.

In the discussion on Mr. Barclay's paper, Messrs. Buckley, of the Ft. Wayne Jenny; Van Depoele, Sperry; Brown, of the Arc Light and Power Company; and Leonard, of the Edison, participated.

The meeting adjourned to assemble at the new rooms, as soon as the Furnishing Committee shall have finished their work. It is hoped the new quarters will be ready for occupation, dummy waiter and all, by the 17th, when all of the boys expect to have a daily reunion for lunch and gossip, about the noon hour.

Among the members of the Chicago Electric Club are several fine looking gentlemen who are not exactly electricians, but in a family where there have been two or three mothers these may stand in the same relation to the regulars as half brothers stand to each other. One of these, a perfect Adonis, by the way, is Glasier, the Jarvis grate man. The pronunciation of that word, mind, is not such as to make it rhyme with masher, please. For an Apollo there is W. B. P., of the Ide engines. Fair, fat and—funny, he is always jolly, can sell an engine or tell a story with equal grace, and is always on hand at roll call. Horn, of the Excelsior, discovered the other day, by the merest accident, that P. was the original model of the saucy little fellow with crayon in hand, who does the writing for *Puck*. The way in which the gentleman handled his umbrella gave him dead away.

CHICAGO, Oct. 10, 1887.

Pittsburgh *Chronicle:* Wonder what will happen when Mitkiewicz tries to tell a Chinaman who he is through one of his own telephones.

The electric "buzzer" or sounder used in the induction telegraph system is a particularly efficient invention, and enabled all who listened at the looped-in telephones during the recent exhibition to easily read the telegraphic messages. This sounder is the invention of Mr. F. B. Coleman, who is joint owner with Capt. W. L. Candee, one of the well-known members of the Electric Club.

Mr. Jackson, of the well-known car building firm of Wilmington, Del., in speaking of the numerous uses of electricity at a recent dinner at the Electric Club, said he hoped Mr. Edison would soon perfect his phonograph so "we can do away with our stenographers." There was considerable objection made to this by some of the young members of the club, who declared themselves well pleased with the pretty stenographers of their acquaintance, now that the gentler sex had entered the profession. Nevertheless, the perfect phonograph will take the place in offices of the stenographer—but the type-writer with all her idiosyncrasies will be in demand more than ever before.

OUR BOSTON LETTER.

(From a special correspondent of the ELECTRICAL REVIEW.)

The contract for lighting Hyde Park has been awarded to the American Electric Manufacturing Company. There are to be used 70 double arc lights of actual 2,000 candle power, and these have been awarded for three years at $70 per light.

The underground system of the Edison Illuminating Company is being rapidly extended. Every night for the past month gangs of men have been at work in the vicinity of the northern portion of Hanover and connecting streets laying a few feet from each curb the Edison three-wire underground conduit.

So little of the street is occupied by the workmen there is no inconvenience to the public, as the surface of the street is restored before morning to good condition.

Mr. C. F. Cook, bookkeeper of the Boston Electric Lighting Company, is to accept a lucrative position in the West. He acted in this capacity at the formation of the Brush Electric Lighting Company, of Boston, in November, 1881, when the station was at Lancaster street and the total service amounted to five arcs.

The Jarvis Engineering Company, 61 Oliver street, make an instructive exhibit at the Mechanics' Fair. Two Armington & Sims engines drive Edison dynamos by which a portion of the exhibit is lighted by incandescent lamps and Sprague motors supplied with current. All sizes of Korting injectors, National heaters from 15 to 500 horse power. Sheffield and National grates, magnesia sectional coverings for pipes form an exhibit worthy of the attention of every user of power The company is busy making the following installations: Westboro Electric Light Company, two 60 horse power Armington & Sims engines and two boilers, with Jarvis setting. The Thomson-Houston system is used; Webster, one engine and boiler; South Framingham, two engines and boiler; New Haven Electric Light Company, 11th order, one engine; Edison Illuminating Company, Fall river, one engine, fourth order; Bath, Me., Electric Light Company, American system, two engines; Jamestown Electric Light Co. (N. Y.) two engines and boilers. In every case the boilers are set with the Jarvis patent furnace to burn cheap fuel. The following stations are being rebuilt: Somerville, Mass., American system, two engines and two boilers, to be made a model station, and a new style of chimney will be erected; Bridgeport, Conn., two engines and the resetting of four boilers.

Saturday evening a delegation from the Boston Electric Club took a dray about 7 P. M. and rode to Savin Hill to attend the 25th anniversary of Mr. and Mrs. Geo. W. Adams, of the Boston Protective Association. They took with them as a souvenir of the event a silver pitcher suitably engraved. After a pleasant drive the party reached the house and all heartily enjoyed the occasion, being happily entertained till late in the evening.

There's no use. Boston is bound to be ahead or nowhere The Volunteer has gone into her quarters for winter as far as she can, and the cup—and myriads of hic-cups—stay on this side of the pond.

Primary batteries are again in the ascendency and have come to stay. Dynamo builders may as well face the inevitable. There's no sort of use any more for dynamos. This time we have 'em, not the jim-jams, but the builders of dynamo machines.

A new battery of two cells, each cell with three subdivisions, has for two months been running nine Consolidated incandescent lamps of 110 volts and 16 candle power, with resistance in the circuit. These two cells give an E M.F. of about 120 volts, so the story was told us.

We cannot obtain a look at this new success, but tell the story as told us and several others, and we had not seen any jig-water either.

The American Watch Company, at Waltham, Mass., have been trying a set of Julian storage batteries to extent of 300 cells, and so well are they pleased that they have duplicated their order.

The N. E. agents of the Mather Company are making a show of three dynamos at the Mechanics' Fair in Boston, one as generator, one as motor, driving the third, which has some 60 lights attached.

BOSTON, Oct. 11.

A Very Cautious Claimant for Electrical Honors.

To the Editor of Electrical Review:

Your last week's paper contained an item which demands my immediate attention. I am one of those unfortunate inventors without means, and have made several inventions or discoveries in the past earlier than others, but while waiting for "a patron" the others have got the honor and reaped the reward, and I got—left.

Now you gave notice, on behalf of Tom Edison, that he has made a *new discovery*, and that he is going to "keep it mum" for six months, to give other fellows a chance to show their hands, etc. That's very kind of him, but it's just a little too thin. Don't you see his little game? He wants a lot of us fellows to publish our wonders, and then, when he has them all spread out before him, he goes into a mesmeric trance, and in this supernatural state his faculties do what he can't himself—pick out wonder-working combinations with which to startle the world. I don't say he has done this, but I don't propose to give him a chance, so far as I am concerned.

Now, I have made a wonderful discovery, and practically completed it, and I send you a full description of it, for you to put in your bank—don't keep it in your office safe, it's too valuable. You are to preserve this for the period covered by Mr. Edison's challenge—six months. I have put my electric seal on the package, and if the package is ever tampered with it will record in a secret manner known only to me, who the culprit was, what day and hour the tampering took place, and exactly what he did. I give you my real name, but not for publication, as I don't want an army of reporters pestering the life out of me while I am busy arranging the great financial scheme for the introduction of my invention into every house in the world.

What do you think of an apparatus any mule could carry on his back, which, burning ten cents worth of oil per day, will make electricity enough to heat a six-room house, give it light in every room, run the sewing machine, washing machine and wringer, and enough left to operate a complete annunciator system?

Wonderful, eh? Well, that's not what I've got. That isn't a circumstance to my discovery. What would you think of the actual knowledge of Cagliostro's secret elixir, the panacea which made him the wonder and envy of centuries? Have I got it? Time will tell, but meanwhile I want to say that I've cut my eye teeth, and don't propose to give Mr. Edison any soft snap on me. I rely on your well-known integrity and honor. CAGLIOSTRO.

New York, Oct. 6, 1887.

—— About a year ago the Arlington Mills Company, of Lawrence, Mass., one of the largest and most important mills in that city, adopted the American arc light system for lighting the mills. A 300-light plant was installed. These lights have been giving perfect satisfaction.

—— There is still a world of discovery in this domain of electricity. A wise man today will say he does not know much about it. Still the field is open for speculation, and we need not settle down on the belief that the books know all about it. The present development of telegraph lines has taught us that electricity is everywhere on the earth's surface, and occasionally it manifests itself in what are now known as great electrical storms.

—— The question of lighting the public streets of Hyde Park, Mass., has been under consideration by the town council for the past six months. Efforts have been made by various companies to get the contract, and bids have been made from time to time. It was finally resolved that a committee should be appointed for investigation as to the merits of the different systems now in use. The committee reported in favor of the American arc light system, and the contract has been given to the American Electric Manufacturing Company, of New York, for the lighting.

Telephonic News

A Legend.

ADAPTED AND MANHATTANIZED FOR THE ELECTRICAL REVIEW.

"Old man, old man, for whom digg'st thou this grave?"
I asked, as I passed along,
For I saw in New York's greatest street,
A dark and busy throng.

'Twas a strange, wild deed, but a wilder wish,
Of the dead, that his body might lie
'Neath the countless millions of living men,
Who would tramp him hurriedly by.

So I said, "Old man, for *whom* digg'st thou this grave
In the heart of the busy town?"
And the digger, in deep-toned voice, replied,
"Shure, we're putten' the soobway down!"

C. B.

*** Mr. Maurice Louis Guirand, of Mexico, the well-known telephone manager, was a New York visitor the past week.

*** An electrical society has been organized in Philadelphia, with permanent headquarters at 1712 Chestnut street. M. D. Law is president and D. R. Gibbs, secretary.

*** The telephone subscribers at Memphis, Tenn., are threatening to organize and order out the instruments, to the number of 850, if a contemplated raise in rentals is carried into effect.

*** A telephone company, with a capital stock of $10,000,000, has been incorporated at Indianapolis. The company propose to manufacture the telephone patented by Hunbert L. Todd, of Washington, the place of business to be in this city. The directors besides Mr. Todd are Ashton Todd, of Newburgh, Frank M. Trissel, of Noblesville, Thomas B. Ward, of Lafayette, Charles W. Adams, of Chicago, and E. J. Ellis, of Washington. We think it will be a long time before the stock is worth par.

*** Concerning the loss of a coat and valise in Pittsburgh, at the telephone convention, one of the losers states that: "Investigation developed the fact that two of Pittsburgh's prominent officials, who had accidentally joined the crowd at the depot, had found it necessary to bid a hasty farewell, and taking the loss of coats and grip-sacks and the hasty departure as a 'ground,' it required only a small portion of Jersey wit to call in the police and arrest the fleeing Pittsburghers. This was quickly done, and not until the train slowly crawled out of the depot was the joke declared off and the 'boys' released. They think they will try their jokes on somebody else rather than a red mud Jersey man next time."

*** Telephone Man—"The progress of science and invention is simply wonderful. Do you know Elisha Gray has just patented an invention by which a man's signature can be duplicated 300 miles away?"

Citizen—"Hadn't heard of it."

"It's a fact. And a way has been found to talk across the ocean."

"You don't say so?"

"True, and another inventor has found a way to transfer a man's portrait for hundreds of miles, so the one at the other end can know who he's talking to."

"Yes? Well, I just wish you'd send a man up to look at my telephone. I haven't been able to use it for a week."—*Omaha World.*

*** "Transmitter" in the Boston *Transcript*, says: "Judge Colt's decision dismissing the suit of the Government against the American Bell Telephone Company has been the subject of much comment in the press, but, so far as I have seen, the real motive of those at whose instigation the Government brought the suit has not been stated. It was made to appear that the object was to test the legality of the Bell patents. The real object was to put a stop to the issuance of preliminary injunctions by the courts. As soon as the Government suit was entered, infringers of every name and kind took heart, and the promotors of infringing companies announced with confidence to those to whom they sought to sell their stock, that, pending the Government suit, no preliminary injunctions would issue. This was poor law, of course; in fact, it was no law at all, and Judge Pardee fairly laughed it out of court in his New Orleans decree; but it partially served its purpose for a time, and holders of the stock of the Pan Electric and other infringing companies unloaded considerable blocks on persons whom they deluded into the belief that, pending the Government suit, any one might make and sell telephones with impunity. Perhaps it will do no harm to make the real facts known."

*** The Caracas office of the American Telephone Company, recently formed in Washington, D. C., report 1,500 subscribers secured and waiting for instruments. The company estimate that 3,000 telephones can be put up in Venezuela the first year. The company has secured from the Government a nine-year right.

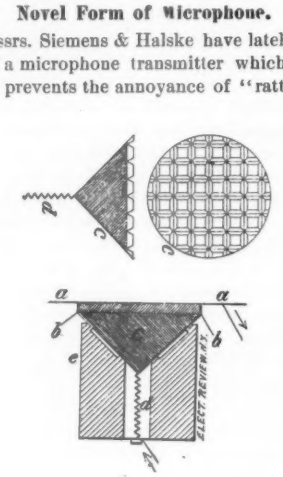
A Member of the Smith Family Revives a Most Excellent Telephone Story.

In speaking of the prospects of improving the telephone, Mr. W. W. Smith, general superintendent of the Missouri and Kansas Telephone Company, Kansas City, gets off the following weird tale:

"There is probably one simple adjustment that can be made in the telephone which would increase their power enormously, but no one has been able to discover this simple adjustment, although there is a fortune for whoever does. I say it is a simple adjustment, merely because I believe it will be found to be so, but I can't guess what it is. When the telephone was first used we had no transmitter, but the receiving instrument was the same as the sending instrument; you had to put it to your ear to listen to it, and then shift it to your mouth to talk through it. Well, when we began to put transmitters in and to charge extra price for their use, there was one man in Sandusky, O., who objected, and sent word to the office that the transmitter was of no use whatever to him, and that he did not propose to pay for it. It was supposed that something was wrong with the transmitter, but on inquiry it was found that this subscriber never put the telephone to his ear at all. He would hold it about six inches from his mouth in speaking, and the telephone would reply so loudly that he never moved it when he listened. Of course this remarkable fact caused some stir in the Sandusky circuit, and it was reported to the general office of the Bell Telephone Company in Boston, and instructions were at once received to procure the telephone and forward it to Boston. This proved a little difficult, for the subscriber refused to give it up and considerable time was spent in financiering with him. At last a special agent of the company was dispatched to Sandusky for the express purpose of obtaining this telephone, which he finally did. It was taken to Boston, all kinds of experiments were tried on it by the most accomplished experts in telephonic science, and the telephone responded as it had in Sandusky. Then it was very slowly and very carefully taken apart, and the relative distances of the various parts from each other was measured as closely as possible. The minutest examination failed to show anything peculiar about that telephone, and so far as could be ascertained it was made of precisely the same materials and in precisely the same way that all other telephones were made. Then the telephone was put together exactly the same way that it had been taken apart, and to the best of expert knowledge and belief it was in exactly the same condition that it was when it arrived from Sandusky. But its wonderful power was gone; no experiment that could be tried brought back the volume of sound that it had previously given out, and it had become merely a common telephone that had to be held to the ear to be of any service Maybe that Sandusky citizen wasn't mad, and sarcastic and satirical? How he did score the Boston scientists and the telephone experts!"

Novel Form of Microphone.

Messrs. Siemens & Halske have lately patented a microphone transmitter which they claim prevents the annoyance of "rattling."



The diaphragm *a* carries a carbon plate *b*, and against this presses the face of a carbon cone *c*, whose conical surface is at 45°, and rests loosely in a smooth cavity of similar form in a metal or glass block *d*. Suitable yielding connections are made. The surface of contact between *b* and *c* may be plain or corrugated. The instrument is used with the diaphragm vertical, in which position the cone *c* slides forward with a constant pressure against plate *b* fixed to the diaphragm. The point of the cone *c* affords a convenient location for a conducting spring *d* of copper wire and weak tension. The articulation is said to be quite perfect.

Regulating Processions by Telephone.

In connection with a jubilee *fete* given recently to 37,000 Glasgow children, an interesting experiment was made with the telephone, showing to what use it might be put in actual warfare, and how, in the event of a city being beseiged, the instrument might be utilized for directing the movements of troops within its walls, thus superseding orderlies. At the headquarters in the Green a telephone was fitted up, connected by special wire with a similar instrument in the exhibition office of 27 St. Vincent place. In the exhibition buildings the committee had also the use of ordinary telephones; these, through the medium of the telephone exchange, enabling Major Cunningham, who conducted the experiments, and his staff to keep in touch with the different parts of the city. About one o'clock a message was received from the headquarters at the Green, stating that a block had occurred, and requesting that the processions of children from the various quarters of the city might be delayed for 20 minutes. Persons stationed at various points were immediately informed by telephone of the request, with the result that the processions were stopped until the block had been removed and the enclosed space on the Geeen was ready to receive a further installment. By means of this system of telephonic communication Major Cunningham was also kept constantly informed of the number of children in each procession as it passed the given points. In case his services might be required, Dr. Garnet Wilson, with an ambulance wagon, was stationed in St. Vincent place, whence he could be sent to any part of the city.

Swindling by Telephone.

A very clever piece of swindling was perpetrated in Washington upon two of the leading hotels. One of the clerks on duty at the Ebbitt House received a telephone message from someone who represented himself as Major Peabody, a well-known permanent guest of the house, requesting the clerk to pay the charges, $54.50, on an express package containing a suit of clothes which would soon arrive. The clerk did as requested, and nothing more was thought of the matter until Major Peabody came into dinner, when it was discovered that both the telephone message and the package were frauds. The Arlington Hotel was swindled in a similar manner out of $64.

Electrical Communication Between Light Vessels and Shore.

It is to be hoped that the singularly inconclusive report just made by the committee appointed by the Board of Trade to consider the desirability of electrically connecting light vessels and lighthouses with the shore, says our London namesake, will not lead to the entire abandonment of the project with which it deals. Without doubt the comparatively heavy cost which would be involved is a formidable obstacle in the way of any extended adoption of electrical communication round the coast; but it should scarcely have been allowed by the committee to surmount every other consideration in their minds and make them timorous of acknowledging the absolute utility of the scheme, if carried into effect. "Without denying the very general proposition," says the report, "that all communication with lightships or lighthouses which would tend to the saving of life at sea would be desirable, your committee feel that their decision must evidently depend upon other considerations, very mainly upon that of cost; and, bearing that important element in mind, we are of opinion that the immediate extension of the system is not desirable." This is rather a startling statement. A little firmer expression of opinion in favor of the "very general proposition" would have been warranted by the minutes of evidence taken before the committee; but at any rate there is the seemingly half-reluctant acknowledgment that a beneficent and useful purpose might be served; and to say that this is the side of the question which, above all other sides, must not be regarded as being of any prime importance, is to convert the whole inquiry at once into a monstrous absurdity.

Fortunately the report does not end there. Further clauses run thus: "We consider that the experiment carried on at the Sunk lightship has not been sufficiently long on trial for us to say that there is not still much to learn. We have also been informed that electrical communication with another lightship, at the entrance to the Mersey, is likely to be established, before long, by the Mersey Docks and Harbor Board. We therefore beg to recommend to your lordship that a final decision should be postponed, and that the experiment at the Sunk lightship should be continued for a further period of eighteen months. With regard to the question of establishing electrical communication with outlying lighthouses and islands, we are of opinion that if Her Majesty's Government would introduce, and carry through Parliament, the bill for the acquisition by Lloyd's of sites for signal stations, many of the difficulties brought before us would be removed, and we therefore recommend this step to the favorable consideration of your lordship." If these recommendations are acted upon it will at least be something to be thankful for. It would not have been very surprising if it had been asserted as an argument against the continuance of the experiment at the Sunk, that, during the twelve months that vessel has been connected with the shore at Walton, not a single occasion has arisen for the use of the cable as a means of saving life or of bringing assistance to a wreck quicker than it would otherwise have been brought; such arguments have not unfrequently been used when it has been desired to depreciate the importance of an innovation, and its introduction in the report under notice would not have been inconsistent with the logic of the statement of which we have already spoken; but a crushing blow was dealt by the Hon. H. W. Chetwynd, R. N., to any inclination which might have existed to put this view forward, that gentleman, who is the Chief Inspector to the Lifeboat Institution, pointing out that a similar argument would apply to many lifeboats, which sometimes go ten or twelve years without doing a service, and then are able suddenly to render very valuable service indeed. This is the view which should be taken of this question of electrical communication. There is undoubted evidence of the fact that wrecks often occur under such conditions that the ordinary means of signaling to the shore are of no avail whatever

in preventing loss of life. Perusal of the evidence of Captain Thomas Emerson, the Hon. H. W. Chetwynd and other witnesses, will impress this very strongly upon the most doubting mind. This being the case, and it being admitted that a readier and more definite means of conveying intelligence to the shore, such as would be afforded by electrical communication, would in many cases answer the purpose of bringing succor to the spot with sufficient promptness, the whole position in favor of the desirability of the electric cable seems firmly established. That the system should be complete and exhaustive at the outset no one will have the hardihood to contend. A gradual adoption and extension of the system is the plan which most readily commends itself, and a beginning might well be made by connecting several of the light vessels on the treacherous Goodwin Sands.

Sir James Douglas gave very valuable evidence of a practical character in this connection. An important point to be borne in mind which he insisted upon is, that the ship with which the experiments have hitherto been made is not of a type to give the best results; he contends for a heavier vessel of a slightly different type, costing about £10,000, and requiring about £1,570 per annum for maintenance. The difficulties of maintaining the cables in efficient working order, great as they must be in the exceptionally trying localities where, usually, lightships are established, Sir James Douglas thought might be got over; even in the case of detached lighthouses, which, established on rocky bottoms, offer the greatest obstacles to successful cable laying and maintenance, he said it was mainly a question of money, for he did not know a single instance in which it would be impossible. The one only objection which Sir James appeared to have to electrical communication was of rather a curious nature; knowing the mercantile marine and the masters of it well, he believed that the temptation to a master to communicate with his wife earlier or later than he could otherwise do would be sufficient sometimes to induce him to risk the lives of passengers and crew by approaching too closely dangerous spots upon which lighthouses are situated. Three men extra would, in his view, be required to attend to the telegraphic duties; and other witnesses doubted whether the capacity of many lighthouses was sufficient to accommodate the extra men and the necessary apparatus, whilst it was also thought that the telegraphists would possibly impede the lighthouse men in the execution of their duties. If a system were once inaugurated, however, all difficulties of this kind would quickly be eliminated.

Upon the whole, we cannot see that there is any insurmountable difficulty in the way of a gradual establishment of a system of some kind, whereby information of the whereabouts, character, and condition of a wrecked ship might with certainty be conveyed instantaneously to shore. The cost undoubtedly would be heavy, and we can only say, whilst reiterating that the expenditure might be made the more tolerable by being spread over a period, that this is one of those directions in which the outlay of large sums would be amply repaid by the services to humanity which the system would be capable of rendering.

* * The Gaynor Electric Company, of Louisville, Ky., has been organized with the following-named directors: Chas. R. Long, C. A. Warren, Jno. J. Barrett, T. F Gaynor, Jno. H. Sutcliffe. The officers are: Jno. H. Sutcliffe, president; Jno. J. Barrett, vice-president; Thos. F. Gaynor, superintendent; E. D. Hobbs, jr., secretary and treasurer. The company will manufacture the rapid fire alarm and police signal system and general electrical supplies. The company is well organized and covers a fine territory for electrical work.

* * The Maryland Electric Motor Company, it is reported, is to establish a factory in Sumter, S. C., to manufacture electrical apparatus, with Mr. C. T. Nason as electrician. An electric railway is to be built for the city.

OUR KANSAS CITY LETTER.

(From a Special Correspondent of the ELECTRICAL REVIEW.)

Several weeks ago an electric light company was organized by the citizens of Liberty, Mo., for the purpose of lighting the city. The company has been working steadily in the way of getting the plant in order and in erecting poles and stringing wires, and last Saturday that little city with the ancient and noble name had the satisfaction of turning night into day. Aside from securing the contract for lighting the city, the company has also been successful in putting its light into many business houses and private dwellings.

The common council of Rochester, Minn., has granted an electric light franchise to the Rochester Light and Power Company. The works are to be completed and the city illuminated by electricity by December, 1887.

Electric light companies are proving pros perous institutions wherever located. A little over a year ago one was established in Larned, Kas., in spite of a great deal of opposition and many prophecies of failure. "But," says a Larned paper in commenting on this company's success, "the men who were in the company, however, went ahead and put in an eighty horse power engine and boiler; a three hundred light dynamo, for incandescent lights, and a twenty arc light dynamo. It was but a very short time before they were running to their full capacity and they now have orders for about twenty-five more arc lights than they are able to supply, and also for a large number of incandescent lights. They are now preparing to put in another boiler of eighty horse power capacity, and a fifty light arc dynamo, and, as they are short of the necessary funds, they have decided to place stock on the market to the amount of $14,000, or such portion of this as may be needed, at eighty cents on the dollar. The plant, with its present capacity, is clearing nearly $200 per month, and with the increase arranged for can more than double this, as its operating expenses would be but slightly increased."

Wichita Construction and Supply Company by its president Mr. J. F. Shearman and W. E Beattie, secretary, filed their acceptance with the Winfield city clerk on last Saturday, of an ordinance granting them the exclusive right to light that city with electric lights, also to supply electric motive power for twenty years. The city of Winfield bind themselves to take not less than twenty arc lights for lighting the streets at $10 each per month, and a large number of incandescent lights have already been subscribed for.

There has recently been introduced in the Topeka, Kas., telephone exchange a new piece of apparatus for eliminating induction, which promises valuable results. This apparatus is a very ingenious arrangement of inductive coils located at the terminal offices, by which two sets of instruments can be used simultaneously on two wires. It is, in fact duplex telephony, although it is necessary to have two wires and each is duplexed. Two conversations are carried over two wires, and a part of each conversation goes over each wire. The conversations are reported at the coils and each goes to its proper telephone without interference from the other. When currents from other wires are induced in this telephone circuit, they flow entirely around it, meet and neutralize each other and thus conversation is unimpeded by them.

A committee representing the Electric Light Company, of Independence, Mo., has been in Kansas City this week, making a close examination of the Brush and Excelsior systems.

A new carriage was tested on the Riverside Park electric motor line, at Wichita, Kas., last Saturday. The trouble all along with this motor line has been that so far the carriages could not be made to stay on the electric tube, which is suspended in the middle of the street, and it has seemed that nothing could be done to prevent the carriage jumping off the tube. This carriage, brought from St. Louis, is after a model prepared by Mr. Leddon, the electrician of Wichita, who claims and has claimed all the time that the system there could be made a success. After considerable minor work in getting the carriages to work freely, a car was run out and the dynamo started. The wires were adjusted and down the track went the car, which had been filled with the interested spectators. By this time it had become dark, and as the circuit of electricity had been found to be open, the car was sent back to the place of starting. Mr. Leddon expressed himself as satisfied with the test, while the spectators were enthusiastic.

An ordinance has been passed by the council of El Dorado, Kas., granting to Frank Wood, of Boston, and T. H. Stevens, of Anthony, Kas., the right to maintain an electric light system and electric motor system in that city for 20 years. Within 3 months, Wood & Stevens are to have a plant in operation with a capacity of 200 incandescent lamps of 16 candle power and 20 arc lamps of 2,000 candle power. Wood & Stevens are also required to give bond for $10,000 to protect the city against damages for injuries through the electric light or motor system to person or property. They are also to furnish incandescent lights for not more than $1.25 a month for a 16-candle light and lights of a higher power at a proportional rate. They are to furnish arc lights for $10 a month for half the night, or $18 for all night.

Clinton, Mo., contemplates the construction of an electric railway from the depot of the Kansas City and Southern road to its great artesian well.

At a special session of the council, last week, an ordinance was introduced revoking the franchise of the Sperry Electric Light Company. The franchise was granted on condition that the company should not sell or transfer to or consolidate or in any other manner associate with any other electric light company in the city. This condition, it is claimed, the company has violated.

It appears that a number of gentlemen, including Mr. James A. Scammon and Alderman Howard of this city, a Mr. Irvingham of Chicago, and a gentleman from Chillicothe secured from the city council in March, 1886, the right to operate the Sperry electric light system in this city. The company represented that it had excellent backing, and on the strength of this and other like representations it was granted the franchise with the condition mentioned.

The Sperry Electric Light Company did actually erect its own poles and supplied one hundred lights to patrons. Its power, instead of being supplied from its own plant, was leased.

It now appears that the Sperry Electric Company's franchise was secured from the council mainly for the purpose of selling to advantage. They were not kept waiting long. The Kansas City Electric Light Company feared competition, for they had been forced to reduce the price of light. The moment the Sperry system was introduced overtures were made which resulted in the transfer of franchise, stock, etc., belonging to the Sperry Company, to the Kansas City Electric Light Company, of which Messrs. Chick, Barnhard, Phillips and Weeks are directors.

Messrs. Scammon and Howard each still own a share in the company, but the rest of the stock, interest in franchise, etc., was sold to the Kansas City Electric Light Company for $30,000. Since the transfer, the companies are, of course, working in conjunction, and the systems have been branched out to supply various sections of the city. In other words they are consolidated, and the price of lights has in consequence gone up.

Mr. E. R. Weeks, manager of both companies, denies purchase of the Sperry franchise, but admits that $30,000 worth of the stock has been sold to the Kansas City Electric Light Company.

John W. Phillips, vice-president and director of the Kansas City Electric Light Company, committed suicide, last Friday. Over-work and over-worry caused insomnia, which resulted in a case of temporary insanity, and whilst in this condition he shot himself in the head. He lived 24 hours after the deed. He was universally respected, upright and honorable in business, possessed brilliant social qualities, and was one of the main movers in the organization and operation of the electric light company.

Kansas City, Mo., Oct. 7.

TELEGRAPHIC

.... The Western Union Telegraph Co. has purchased the B. and O. Telegraph Co.

.... An additional telegraph wire will be placed along the Air Line between New Albany, Ind., and St. Louis. New poles are to be put in, and as soon as the work is completed the second wire will be placed in position.

.... The American District Telegraph Company, of Lincoln, Neb., now owns eleven miles of wire and about 200 boxes. The number of boxes will be doubled, and every foot of wire will be taken down and replaced with the best insulated variety. The machinery of the office will be also improved, making it, so the manager says the equal of any in the State. Mr. A. P. Martin recently purchased a controlling interest.

.... Mr. Jay Gould astonished the financial world somewhat by electing his 21-year-old son, Eddie, a Director of the Western Union Company. The boy is said to be bright and clever for his years; he has known enough to sell Western Union and Missouri Pacific short every time his papa has come with a bull bugle blast, his profits on open sales in this way being estimated in Wall street at $200,000 or $300,000.

.... Dr. H. A. Bunker, of Brooklyn, an able and progressive young physician of that city, who has a large number of friends in electrical circles and is a member of the Electric Club, was married in the Church of the Reformation, Brooklyn, to Miss Katherine Hackett, October 5th. There was a large attendance of friends. Mr. Geo. Worthington was the groom's best man, and Messrs. Franklin H. North and A. F. Stanley gracefully performed the duties of ushers.

.... Colonel Clowry, vice-president of the Western Union Telegraph Company, has been in San Francisco making arrangements for additions to the company's system. Business has so greatly increased that for more than a year the company has been unable to satisfactorily handle dispatches. New wires will be built to Los Angeles and San Diego, which have suffered more severely than other points. Lines will also be constructed to many new towns in Northern California.

.... There are now twelve telegraph wires between Paris and London, besides two wires between Marseilles and London, with junctions at Paris. There are ten telegraph wires from Paris to Germany, viz., four to Berlin, two to Frankfort, one to Cologne, one to Hamburg, one to Strasbourg, and one to Mulhouse. Metz has no direct telegraphic communication with Paris. To Austria three wires have been carried from Paris, viz, two to Vienna and one to Bregenz. As regards Belgium, there are two wires from Paris to Brussels, and two from Paris to Antwerp. Denmark is united directly to Paris by a submarine cable from Frederica to Calais. Only one wire has been carried to Spain, viz.: from Paris to Madrid. Two wires have been stretched from Paris to Amsterdam. Italy has six wires from Paris, viz.: two to Rome, one to Florence, one to Turin, one to Genoa, and another to Milan. There are four wires between France and Switzerland, viz.: two to Geneva, one to Bale, and one to Berne. As regards the internal telegraphic system of France, it may be added that six wires now unite Paris to Marseilles; Bordeaux and Lyons have each four wires; Lille, Havre, Brest, and Toulouse have three each; and Amiens, Montpelier, and Nantes have two wires each. All the other provincial prefectures are united to Paris by a single wire with the following exceptions: Tuille, Quimper, Mont-de-Marsan, Foix, Carcassonne, Privas, Gap, Digne, Mende, and Ajaccio. These omissions will shortly be made good.

ELECTRICAL AND SCIENTIFIC

* * A magnetic register connection of water meters has been patented by Messrs. Albert S. Dietzman and George Cressey, of Louisville, Ky. This invention utilizes a permanent magnet, moving in the water with the mechanism of the meter, and influencing, through the walls of the case, an armature with contacts controlling an electric circuit outside of the meter case.

* * M. Garel has invented an electrical method of preparing paper stencils for letters, circulars, etc. In this apparatus a piece of very thin paper rests on a carbon block connected with one pole of a small induction coil, while the style, with which the writing is done, is connected with the other pole. On using the apparatus a series of sparks pass between the style and the carbon block, perforating the paper, which can then be used as a stencil in the ordinary way.

* * A man from Michigan who was admitted to the apartments of the king in the royal palace at Amsterdam says that he passed through a door hung on brass hinges and secured by a brass lock coming from a Massachusetts manufactory. A chair from Grand Rapids and a cuspidor, the product of a Baltimore manufactory, stood near. Over the mantel, designed by an American, hung a landscape by Thomas Moran, of Philadelphia, and upon it, among other ornaments, were a Colorado stag vase and a box of Michigan toothpicks.

* * Purifying river water by means of electricity is an experiment of a French gentleman. The gist of the process is that the ozone generated by the electrolytic decomposition of the water kills the minute organisms and oxidizes all organic substances, at the same time precipitating the carbonates in course of dissolution, thus effectually purifying the water. The greatest drawback is the expense of the process, which amounts to one penny per one cubic meter of water, but M. Stoffel thinks that this could be materially reduced by the sale of the by-products obtained in the process.

* * In New Orleans, where the soil is water-logged three feet beneath the surface, they get over the difficulty of putting telegraph and telephone wires underground by erecting strong towers 150 feet high at intervals, and bracing them together with cables of steel-wire rope. These cables support the cross-arms, etc., to which the telegraph and telephone wires are attached, and the wires are securely carried above the public streets. The towers are also utilized for fire-extinguishing purposes, as a standpipe, with nozzles at different elevations, is fitted to each tower.

* * It is well known that some of the large yachts have a great many tons of lead stowed away in their keels. It has now been suggested that this lead could be utilized in the shape of accumulators that could thus be made to carry several horse power, which, with the intervention of a motor, could be utilized in working the windlass, hauling in the main sheet, etc., and furnishing light as well As is remarked, it would be rather a novelty to have the ballast weighing the anchor or hauling at the ropes; but stranger things than that have been done before.

* * It has been proposed to heat street cars by raising the temperature of wires by an electrical current. Baron Gostkowski, general manager of Austrian railways, has calculated the power necessary to heat a railway car in this way, and his results for an ordinary German car holding 42 persons show that 20 horse power are necessary to heat it, while it requires only 8 horse power to haul it at the rate of 22 miles per hour. Proceeding in the same way with an ordinary street railway car seating 20 persons, he finds that to keep the temperature of the interior of the car 30° Fahr. above that of the exterior requires an expenditure of about 3 horse power.

The Sale of the Baltimore & Ohio Telegraph Company.

There seems to be no doubt from the facts as they are known at present, that the purchase of the Baltimore & Ohio Telegraph Company, its lines and properties, which was announced last week, is a personal purchase by Jay Gould.

Dr. Green, the President of the company, said two or three days ago, when negotiations were then believed to be approaching a conclusion, that no settlement could be accomplished, so far as the Western Union Company was concerned, without the approval of the Board of Directors and three-fifths of the stockholders. On the top of this statement he said, Thursday afternoon, that the Baltimore & Ohio property had been absolutely purchased by the Western Union and that the entire plant belonged to them. In the interval there had certainly been no opportunity to secure any consent from the stockholders, and it was only announced this morning that the Board of Directors had ratified the purchase. Taking Dr Green's first statement as true, this ratification by the directors would not complete the sale. Moreover, this point was made on Wall street by men who are well acquainted with telegraph matters. The Western Union Telegraph Company has not now in its treasury the five millions of stock which is named as the purchase price, and therefore the corporation, as such, could not conclude the transaction, simply because they could not pay for what they had bought. By many it is believed that the 50 000 shares of Western Union stock which have been transferred to the syndicate in payment of the Baltimore & Ohio property came out of Mr. Gould's personal strong box, and the stock of the Baltimore & Ohio Telegraph Company, amounting to over three millions of dollars, will or has been handed over to Mr. Gould.

The opinion gained ground yesterday on Wall street that the matter was arranged in this way in order to bring it to a prompt conclusion, and the reasons for the obvious haste were subjects of some speculation. It was not generally believed that Mr. Garrett's attitude in the matter is as compliant as representatives of the syndicate were disposed to announce. It was thought, in fact, that if the matter of the purchase had been delayed until after the arrival of the principal owner of the Baltimore & Ohio properties, it would not have gone through so smoothly and so satisfactorily to Mr. Gould and the Western Union. "If everything was all right," said a Wall street man, "where was the necessity for such a rush? Why should not the proposition for purchase have been submitted to the directors and stockholders, and their consent obtained after the usual formula? There seems to be but one answer to these questions, and that is, that Mr. Gould and Mr. Morgan thought it wise and expedient to conclude the matter before Mr Garrett's arrival."

Of course there is no idea down-town but that Mr. Gould had the right to buy the Baltimore and Ohio wires, or anything else that he can pay for; but the rather autocratic way in which the thing had been done, and the assumption that the Western Union stockholders would indorse his action in the matter without question, was widely commented upon. The annual meeting of the stockholders occurs the 12th inst., and the new issue of five millions of stock to reimburse Mr. Gould's outlay will undoubtedly be authorized at that time. In this connection it is pointed out that when proxies were asked for to use at its annual meeting, the stockholders did not understand that the matter of issuing new stock to such an amount as $5,000,000, or any other business of equal importance, would come up. It is not known that these proxies can now be recalled; but the door is certainly open to some very interesting speculations. In the same line with the dispatch from Philadelphia yesterday, announcing that the Baltimore and Ohio privileges in that city were secured under the express stipulation that the company would always maintain a competing line, and that its failure to observe this stipulation involved a confiscation of the wires and poles within the city limits, and the forfeiture of a fifty thousand dollar bond, it is interesting to note that the statutes of the State of Pennsylvania expressly prohibit any such sale as has been made of the Baltimore and Ohio property. The Western Union will probably lose, therefore, a portion of the plant in that State, and perhaps in other localities; but as the purchase was made nearly as much for the purpose of terminating competition as for the acquirement of the actual plant, this matter, and the little suits that are bound to grow out of it, will not probably trouble the Western Union people to any extent.

Another interesting question which has come up in connection with the transaction is whether or not, under the law of 1870 in this State, which was passed practically by representatives of the telegraph interests, the Western Union had any legal right to purchase the Baltimore and Ohio system. This act is to the effect that purchases of telegraph lines can be made for the purpose of extending connections into other States, and to complete the general service to the public. Certainly the system of the Baltimore and Ohio wires cannot be described as making connection with those of the Western Union, for they reach the same great points in parallel lines

All the possible and probable effects of the consolidation were considered in Wall street offices. The effect on rates, the probable closing up of telegraph offices and dismissal of employes, and the outcome of the present situation, so far as the Mackay cable and the connecting land lines are concerned, were all industriously canvassed.

George Gould said that there would be no general advance in rates. The public might rest easy on that score. The service would be improved and rendered as efficient as possible in every direction. Mr. Somerville added to this what was understood to be an official statement to the effect that the existing schedule of Western Union rates would continue unchanged. He said that this corresponded with the Baltimore and Ohio schedule, except that to some points that company had established a 10 cent rate, and that this would be abolished. In conclusion Mr. Somerville referred to the pleasant fact that the Western Union was now in control of the telegraph wires along the trunk lines of railroads between the East and West, and animadverted on the fact that the construction of telegraph wires across country or along public highways not traversed by railroad tracks had always been attended with failure.

It was stated early in the day in Wall street, with some appearance of authority, that Mr. Gould and his associates, having performed the act of deglutition in the case of the Baltimore and Ohio, were busily preparing another banquet, where the Mackay-Bennett cable and the United Lines would be the principal features. The story announced that Mr. Mackay was willing and that a price had been named, and that the whole affair was in the hands of Messrs. Edward Lauterbach and S. L. M. Barlow, whose desire for all-around so-called harmony and the consolidation of everything under the sun was counted on to remove every obstruction in the way of a sale. In respect to these statements Mr. De Castro, Vice-President of the Commercial Cable Company said that there was no truth in them. Mr. Mackay, he said, was not willing to sell, and that no price had been named Mr. Mackay is in California and will not be East until late in November.

The situation in the matter of the opposition cable and the connecting lines on land seems to be that Mr Mackay is tired of the cable war, and is disposed to negotiate with Mr. Gould and the Western Union, with the idea of entering into some agreement on rates. Whatever agreement may be arrived at, it would cover the Postal and the United Lines system of wires. But whether or not the agreement would finally take the form of an actual sale cannot be forecast. The Mackay people say it will not

A statistician in telegraph matters said that the consolidation would result ultimately in throwing 2,000 people out of employment. The Baltimore and Ohio Company has now 3,500 people in its employ, and under the new conditions only 1,500 of these will be required.

Gas into Electricity.

"AN UNIQUE LIGHTING PLANT" IN OPERATION AT SPENCER, MASSACHUSETTS.

In its September number, *Practical Electricity* has an interesting account of "an unique lighting plant" in Spencer, Massachusetts, in which gas furnishes the motive power, and by means of gas engines and dynamo machines is transmitted into electricity for lighting purposes. Something over a year ago the *Boston Herald*, in an article on gas and electricity, ventured the prediction that the time would come when a better and more intense illumination could be had from gas by means of the gas engine and dynamo electric machine than from the gas itself, and, according to the article in *Practical Electricity*, this has been accomplished in Spencer. From the account in that journal, it appears that early last spring the gas company of Spencer—of recent establishment—began to consider the question of electric lighting, and first tried the experiment of operating 25 arc lights in the town by means of a single ten horse power gas engine, and a small steam engine belted to counter shafting. Although not a success from an electrical standpoint, the people of the town were immensely pleased, and, in a public meeting, they voted, authorizing the selectmen to make a contract with the Spencer Gas Company to furnish 60 arc lights for one year at 33½ cents each per night. Three new Otto gas engines were purchased, an extra dynamo, additional lamps to make a full quota of 60, and the necessary wiring was also accomplished. On the first day of last July the entire plant was put in operation, and has been successfully operated since that time.

A visit by a representative of practical electricity to the plant at Spencer gives sufficient data and evidence to show that gas can be cheaply and successfully used to do an electric lighting business. Three Otto gas engines, with an indicated total capacity of 45 horse power, were operating two Ball dynamos. The dynamo pulleys had a speed of 1,200 revolutions; but of the 45 horse power of the engines the writer estimated that the dynamos actually received not more than 36 horse power of energy. "Nevertheless," he writes, "both engines and dynamos worked magnificently, and will work better after having been longer in use. Taking both engines and dynamos at their best at this rating, sufficient power was given off to successfully operate at least 20 more lights. The amount of gas consumed in the run of 4½ hours was 3,910 cubic feet. Calling it in round numbers 4,000 cubic feet, there was an expense for fuel of $2 00, the cost of the gas being rated by the company at 50 cents per thousand cubic feet. Hence, the cost of the 60 lights on the circuit was 3½ cents per lamp for 4½ hours' run. It will be seen, further, that, in this case, the dynamos were operating very nearly two lamps per horse power. The writer has not the smallest doubt of the approximate accuracy of the above figures. Finally, it may be said that the only items of expense to be figured into the cost of operating these lights are the salary of the man ($15 per week) who looks after the station and the lamps and conductors also, the cost of the carbons and the oil used for lubrication. The rental of the room is virtually nothing."—*Boston Herald.*

—— It is understood that the bids for lighting the different portions of New York city have been finally acted upon, and contracts awarded to the various electric light companies represented in New York. A considerable portion of the lighting in Harlem was awarded to the American Electric Manufacturing Company, and a local company has now been formed under the name of the American Illuminating Company, of Harlem, to put in a plant. The company is now putting in a central station, wires, etc., and will soon be ready to commence operations. It is understood that the company will be begun with a 200-light plant.

OUR PHILADELPHIA LETTER.

(From a Special Correspondent of the ELECTRICAL REVIEW.)

The electrical business of our city is in a very satisfactory state. Our electrical supply and appliance people are all as busy as they can be, many of the shops working overtime and with increased force to keep up with their orders. We are anxiously waiting to see the trial trip of the Edgerton motor on our street cars, which we are informed will be made in a few days. In a conversation with Mr. A. J. De Camp, who is manager of the following companies—the Brush Electric Lighting Company, the Northern Electric Lighting Company, and the United States Electric Lighting Company—he informed us that all their old contracts were being renewed and new contracts being constantly made. He further said that the arc light had not lost any of its popularity, but as time goes on its particular merits seem to be better appreciated. The arc light business is only limited to the extent of their ability to erect wires to supply the demand.

We were lately shown an electric organ, the invention of Mr. W. L. Jukes, which is certainly a scientific wonder; he claims it to be the first electric organ built that will fulfill all the requirements needed by an organ of that kind, playing as it does all the instruments of a brass band, the instruments being placed at distances of 20 to 100 feet from the instrument.

A. F. Fleischmann, manufacturer of electrical apparatus, has removed from 1226 Chestnut street to 504 Arch street, where he will still continue the business.

The Thomson Houston Electric Light Company, 1110–1116 Noble street, are rushed with orders, and are now installing a 35 arc plant in the handsome store of Darlington, Runk & Co., Chestnut street, this city, also a 35 arc and 100 incandescent plant at Hughes & Patterson's rolling mill of this city. At the Cumberland Valley Railroad shops, at Chambersburg, Pa., they are putting in a 25 light apparatus; a 30 light plant at the Diamond State Iron works, Wilmington, Del.; a 35 light plant at the Lock Haven Gas Company, at Lock Haven, Pa.; and a 50 arc light and 700 incandescent plant for the Mountain City Electric Light Company, Altoona, Pa. They are just commencing the installation of a 200 arc light plant at Baltimore, Md. The 500 incandescent light plant put in the Bergner & Engel's Brewing Company's Buildings will be running next week, and the plant put in by the same company, for Shawbridge & Clothier, the large dry goods merchants, will be ready to run at the same time.

The Penn Electric Lighting Company, 123 S. 11th street, are going ahead rapidly, and getting their full complement of the incandescent lighting of this city, using both the direct and alternating current. They have about fifteen miles of underground work under way, which they are rapidly pushing to completion.

The Sawyer-Man Electric Company, 308 Walnut street, are making an addition to the lighting of the Westtown Boarding School; lighted up George W. Patton & Co.'s mill, at Bemont, Pa.; put in a plant with power at Wanamaker & Brown's, this city; installed a plant on the steam packet Brandywine, running from Philadelphia to Wilmington, Del.; put in a plant for Tallman & McFadden, hardware dealers of this city; have put in a third installment for Baugh & Son's Company; have wired a yacht for Mr. Lovejoy, of New York; also Commodore Singerly's yacht Restler; have installed a plant at Jos. S. & Thomas Elkinton's Soap Works; also at the new building of Hirsh Bros., umbrella manufacturers; and at James Irving & Son's Mill, at Chester, Pa.; and are now putting in a 100 light plant at the Arasapho Mill, Chester, Pa.

Shaw & Geary, 55 N. 9th street, manufacturers of electrical appliances, are full of orders. The printing telegraph instruments, that this firm have been working on for months, are now finished, and will shortly be put to work.

PHILADELPHIA, Oct. 6.

Lighting Railway Trains in Tunnels.

An interesting description of a system of lighting trains while passing through tunnels is given in *Engineering* of Sept. 23, 1887, being the system in use on the Glasgow City and District Railway. An insulated third rail, reaching the length of the tunnel, forms one conductor and the ordinary rails the other, supplied by a dynamo in the neighborhood of the tunnel. Each car of the train has contact devices to touch the two conductors automatically on reaching the tunnel, and the lamps in each car are thus automatically lighted on entering and extinguished on leaving the tunnel. The dampness of the tunnel causes some leakage, but it is trifling. The dynamo leads have safety fuses, to avoid damage in case a trailing brake rod or other accident should short circuit the positive and negative rails. A six months' test seems to prove the scheme a success. About 2,000 watts suffice.

Eight trains—or, in all, 74 carriages—have been fitted and are running daily. Taking the running of these trains for six months, the total number of lamp hours is 39,642. During this time it has been necessary to replace 44 lamps, so that the average life of the lamps has been 900 hours each; but as eleven of these lamps were broken maliciously by passengers in the trains, their actual life is 1,210 hours.

In this system the electric light is not used at night, the gas or oil lamps being still made use of, which are there to fall back on should a breakdown take place. In the other systems the electric light was used alone, and could be made use of any time, whereas in this it can only be had in the tunnels. Of course it has the advantage of allowing the trains to be broken up (which is done sometimes twice a day) without having any extra couplings, and having the light only when required, without the control of any one. The cost of this system is less by a fourth than that of either of the other two, and fully a third less than that of gas, while the working expenses are much the same as the first two systems, but a third less than gas lighting.

Buckling of Secondary Battery Plates.

Messrs. Broadbent & Haslam make the following statement in a recent number of our London namesake:

"There appears to be still a great deal of uncertainty as to the cause or causes of 'buckling' in the peroxide plates of secondary batteries.

"We, the writers of this letter, think that the expansion of the paste, owing to its conversion from red lead into peroxide, is insufficient in itself to account for this effect; for, if this were so, the same amount of distortion would take place, no matter what charging current was employed; as the paste would expand to just the same extent independently of the rate of conversion. Our own experience teaches us that in all probability buckling is the effect of a number of causes, of which the principal are the following:

"1. *The expansion on the part of the lead grid itself, owing to surface peroxidization.*—This, no doubt, takes place; for when we take an empty grid, and pass a strong current through it, it buckles. We have also found that if, instead of pasting with red lead, we use a mixture of finely divided lead and red lead, buckling and disintegration take place to a larger extent than with the plain red lead, proving that buckling is due more to the expansion of the metallic lead than of the oxide.

"2. *The too rapid evolution of gas in the substance of the active material when an excessive charging current is employed.*—The oxygen, while in the chemically active state, termed 'nascent,' combines with the red lead and oxidizes it; but it only remains in this state for a very short time, and unless it is able to act upon the red lead at the moment of its liberation, it does not do so, as it then ceases to be 'nascent' and accumulates in the plate. Its temperature becoming raised by the passage of the current it expands, and unless it can escape, it either forces out the plugs or distorts the plate.

"3. *Inequalities in the distances between two plates*—This may either be a defect in the manufacture, or be produced by either of the above mentioned causes. This results in an unequal density of current passing at different parts of the plates, and, consequently, aggravates any 'tendency to buckle' by the expansion of these parts more than the others."

—— The Fort Wayne Jenney Electric Light Company has contracted for 200 arc lights, and 1,200 incandescent of the Slattery alternating system, to be placed in the city of Richmond, Va.

—— The electric light people of Marion, Iowa, are getting estimates from companies who wish to enter into a contract for putting in the plant there. The Edison and United States companies have put in bids for the work, and the Westinghouse alternating system will also be presented.

—— The officers of the Thomson-Houston Carbon Company are: President, Willard B. Hosmer, Boston, Mass.; treasurer, H. St. Clair Putnam, Davenport, Ia.; directors, William R. Caulkins, H. St. Clair Putnam, Willard B. Hosmer, Charles A. Coffin, Ellery I. Garfield. The capital stock is $250,000. The works are at Fremont, Ohio.

—— The Sanford Light and Water Company was organized at Sanford, Me., for the constructing, maintaining, running and operating of electric lights in the town of Sanford. The amount of capital stock is $6,000; amount paid in, $1,260; par value of shares, $10. President, E. M. Goodall, Sanford; treasurer, Geo. H. Nowell; directors, E. M. Goodall, B. F. Hayden, H. Hodgson.

—— The Gas Commissioners gave a continued hearing on Saturday on the petition of the New Bedford Gas Light Company for leave to light the city of New Bedford with electricity. The Edison Electric and Illuminating Company, which appeared as remonstrants, offered testimony to show that the Westinghouse system, which the petitioners desired to introduce, was more expensive than the Edison and would not accomplish what was expected of it. The commissioners reserved their decision.

—— Notwithstanding the greater safety of using the electric light instead of gas for theater illumination, London managers have been backward in adopting it. Out of a total of thirty-eight theaters in the metropolis, only three—viz., the Savoy, the Prince of Wales and the Criterion—have hitherto used the electric light, which in each case has proved very successful. The Haymarket Theater is now added to the list, the auditorium having been lighted last week by means of incandescent lamps. It is intended later on to extend the system to the stage, where it is of greater importance, as far as fire risk is concerned.

—— Experiments with the new self-exciting dynamo-electric machine invented by MM. Dandeu and Chertemps show some interesting results. A wooden board is pierced with holes, in which are solidly fixed six coils, and is fixed on a support, and through a hole in its center passes a movable axis. In a plane perpendicular to the board are two groups of three horseshoe magnets, with coils similar to those in the board, and making twelve hundred revolutions per minute. It is on the fixed board that the currents are collected by an arrangement which allows of grouping them in as many currents as there are cylinders, less one, the electricity of this latter cylinder not being used for the exterior work, but serving to excite the moving electro-magnets. The machine is represented as consuming a motor force of only four horse power, while supplying ten Jablochkoff candles in a normal way. The special merit of this apparatus, according to the description, consists in the suppression of the induction currents, which are produced in the heart of the iron pieces facing each other in other generators.

Electric Lighting in Spain.

There is at present a movement in favor of the adoption of electric lighting at Madrid; and if important central stations were established, it is probable that they would now be able to do a good business. As it is, the only station at work is on a very small scale, and in consequence theaters, hotels and clubs are arranging for private installations. The Athenæum Society, of which most Spanish scientists are members, have determined to install the electric lights in their building.

ELECTRIC LIGHT NEWS

—— The Berkeley (Cal.) Electric Light Company has been incorporated.

—— A move is being made at Manchester, Va, to light the streets by electricity.

—— The city of San Jose, Cal., has contracted with the Brush Company for street lights.

—— The Mather Electric Company secured the contract for lighting the building of the American Institute during its fair, which is now in progress.

—— The Union Wave Light Company, Lake View, Ill., has been organized with a capital stock of $50,000. John Hufmeyer and others, incorporators.

—— The Electric Light Company of Omaha, Neb., are running a 300 horse power engine, using sixty miles of wire and 250 lights of 2,000 candle power each.

—— The Electro-Libration Company, Birmingham, Ala., has been organized with a capital stock of $1,000,000. Cornelius Doremlus and others, incorporators.

—— The Washington, Kan., Electric Light, Power and Heating Company has been incorporated. The capital stock amounts to $12,000. A. W. Moore is president.

—— The Accumulator and Motor Company, Jersey City, N. J., has been organized with a capital stock of $250,000. John M. Pendleton and others, incorporators.

—— The Oneonta Electric Light and Power Company, Oneonta, N. Y., has been incorporated. Capital stock, $15,000. Harlow E. Bundy and others, incorporators.

—— The city council of Pueblo, Col., has entered into a five-year contract with the Pueblo Electric Light Company, to light the business streets of the city. The cost will be about $5,000 per year.

—— In about ten days, President Wharton, of the Philadelphia Electric Car Co., says, a new eight-wheel electrical car, having two motors of 11 horse power each, and equipped with storage batteries, etc., will be given a trial.

—— Marshall Field & Co. have ordered 50 additional lights for their mammoth dry goods house, increasing their plant from a capacity of 180 to 230 full arc lights of the Western Electric System. This is the best lighted dry goods warehouse in the city of Chicago.

—— Emporia, Kansas, will soon be in a much better position than she is now as regards light, the gas and electric light company having decided to put in an incandescent plant in this city, which will furnish electric light for business and private houses on moderate terms.

—— The Electrical Car Company, of London, England, is about to introduce its system of automatic propulsion on one of the metropolitan tram lines, and is to build a large electrical locomotive for drawing trains on the Underground Railway. Under this system the vehicle contains the batteries, which are charged at night and worked in the day. The cars can carry five tons at over twenty miles an hour.

—— The great dragon drawn in a recent Chinese procession in San Francisco was manipulated by means of electric wires. At a given signal one of the men who marched under it touched a button within easy reach, thus charging the machinery with electricity and causing the huge jaws to fly open, disclosing a mouth about the size of the Hoosac tunnel, filled with frightful fangs, and darting forked tongues of fire, the whole thing being calculated to strike terror to the soul of the beholder. Another set of wires produced a series of particularly horrifying contortions, at the same time blowing two lurid sheets of fire from his nostrils.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING OCT. 4, 1887.

370,794 Dynamo-electric machine; Wilhelm Lahmeyer, Aachen, Prussia, Germany.

370,801 Electric gas lighter; John J. McGowen, Ithaca, N. Y.

370,831 Electric signaling apparatus; Jacob P. Tirrell, Boston, assignor to James F. Emerson, Wakefield; George O. Carpenter, Boston; and John W. Carter, Newton, Mass.

370,847 Resonant attachment for telephones; Edward A. Balloch, Washington, D. C.

370,885 Fire alarm and p lice telegraph system; Alexander M. Neeper, Pittsburgh, Pa.

370,894 Electric car brake; William M. Schlesinger, Philadelphia, Pa.

370,898 Telegraph receiver; Charles Selden, Baltimore, Md., assignor to himself: Wm. T. Barnard, same place; and Francois Rysselberghe, Brussels, Belgium.

370,932 Electric alarm clock; Edward J. Colby, Chicago, Ill.

370,955 Subterranean electric line system; Geo. W. Le Vin, Chicago, Ill., assignor to Horatio N. May, same place.

370,978 Printing telegraph; Robert J. Sheehy, New York, N. Y., assignor to the Independent Printing Telegraph Company, same place.

370,992 Process of treating electric light filaments; 370,993, Incandescent electric lamp; 370,994, Process of evacuating globes for incandescent electric lamps; 370 995, 370,996, 370,997, Process of manufacturing filaments for incandescent electric lamps; 370,998, Process of forming filaments for incandescent electric lamps; 370,999, Manufacture of incandescent electric lamps; 371,000, Process of bending filaments for incandescent electric lamps; 371,001, 371,002, Process of treating filaments for incandescent electric lamps; 371,003, Incandescent electric lamp; Edward P. Thompson, Elizabeth, N. J.

371,111 Conduit for electrical distribution; Thos. Wallace, New York, N. Y.

371,147 Railway signal; Peter Milroy, Jerauld county, Dak.

PATENTS.

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"In making the statements which follow we can verify each and all of them as facts. Mr. Edward P. Thompson, of Temple Court (7 Beekman St.), New York, is a good man to bring your patent cases to, for he is thoroughly versed in all the ins and outs of a Patent Attorney's duties. The following are some of his qualifications: Graduate of Stevens Institute as Mechanical Engineer. For four years tutor of classes of young men in mathematics and experimental physics at Elizabeth, N. J. Served professionally as Electrician and Chemist in the Swan Electric Company of New York for two years. Because of past successes as a Patent Attorney at 13 Park Row, New York, was appointed, to succeed N. S. Keith, of the patent agency of the *Electrical World* and Associate Editor. N. S. Keith is known as the Translator and Reviser of Schellen's Treatise on "Dynamo Electric Machinery." Mr. Thompson for two years personally prepared and prosecuted all the patent business of *Electrical World's* Patent Agency, and is the author of a series of articles in said paper upon "Analytical and Systematic Method of Inventing," which were widely known and favorably received. Mr. Thompson is a member of American Institute of Electrical Engineers and American Society of Mechanical Engineers. He is author of the "Expansion of Polynomials," which the ablest mathematicians of the world universally commend." —*New York Observer*.

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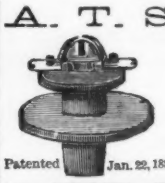

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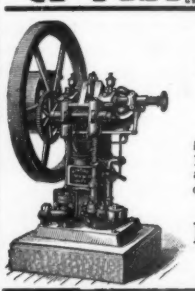

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